The IRON AGE
July 25, 1957
The National Metalworking Weekly

How To Get More For Your Machining Dollar P. 113

Metals Gain in War On Old Building Codes P. 67

What's Market Outlook For Foundry Equipment? P.146

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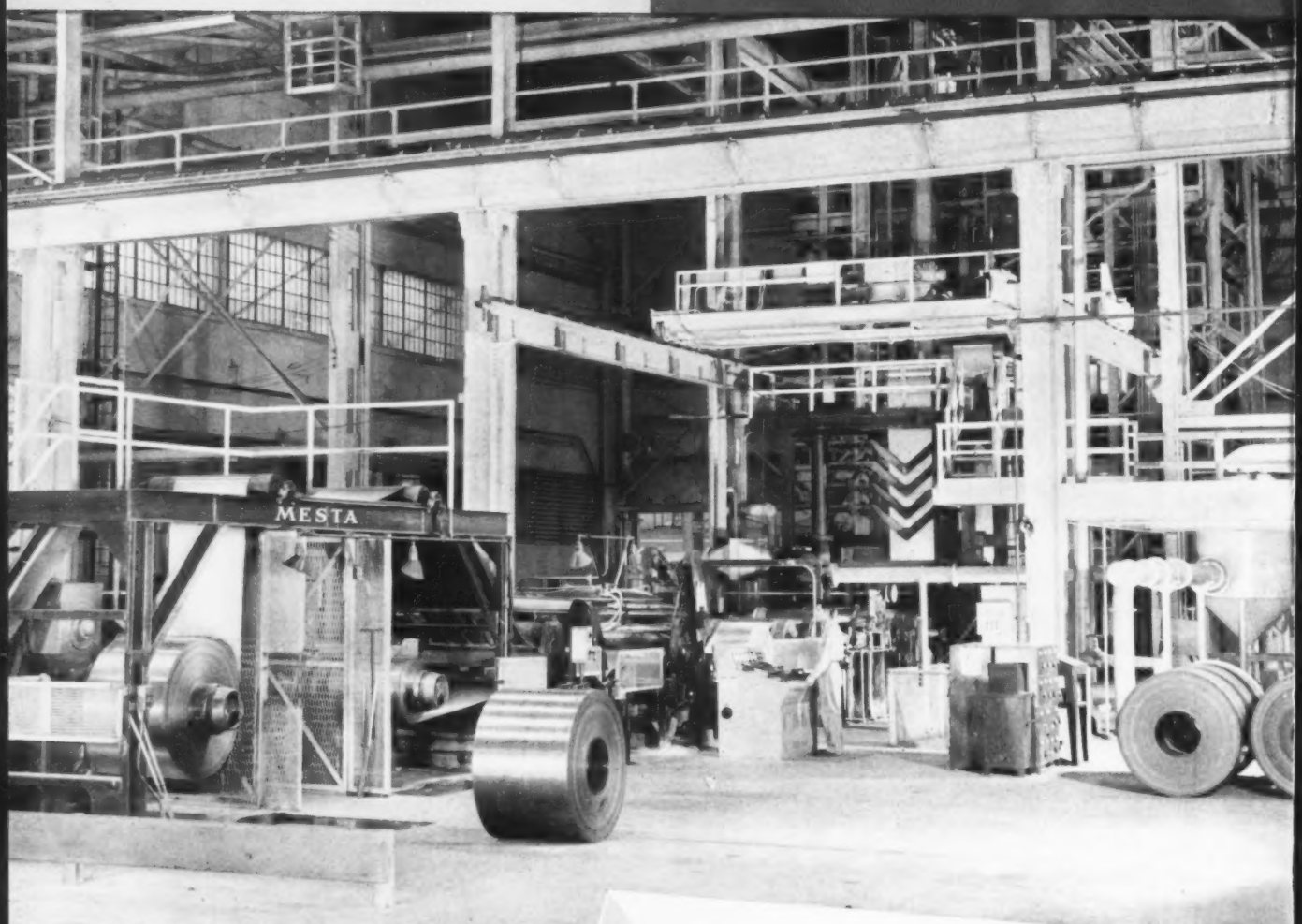
CONTINUOUS CLEANING *and* ANNEALING LINES



MESTA CONTINUOUS CLEANING AND ANNEALING LINE FOR TIN PLATE WITH PAY-OFF REELS, DOUBLE SEAM WELDER, SHEAR, AND TENSION REEL

Designed and Built by MESTA

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

XXII

This is the twenty-second of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Normalizing Alloy Steels

There are several forms of heat-treatment commonly employed in the processing of alloy steels. Each in its own way modifies the mechanical properties and structures of steel, and each is chosen with a definite objective in mind. The five usual forms of treatment are normalizing, annealing, spheroidize-annealing, quenching and tempering, and stress-relieving.

In this particular discussion, let us consider briefly the purposes and effects of normalizing.

Normalizing is an operation in which the steel is heated to approximately 100 deg F above the upper transformation range, then cooled in still or agitated air. The basic purpose is to refine the prior structure produced by variations in finishing temperatures encountered in rolling or forging. The structure resulting from normalizing, being more uniform, will help create improved mechanical properties when the steel is subsequently reheated, liquid-quenched, and tempered.

There are times when large steel parts (heavy forgings, for example) cannot be liquid-quenched because of their size. In cases of this nature, the heat-treatment must consist of single or multiple normalizing followed by tempering.

High-temperature normalizing is sometimes used for grain-coarsening low-carbon alloy steels to promote machinability. (In high-temperature normalizing, steel is heated to more than 100 deg F above the upper transformation range.) At times it is possible to machine a steel in the air-cooled condition, the governing factor being the alloy content. However, the highly alloyed analyses may require annealing or tempering after normalizing, to decrease the hardness.

It is essential, when normalizing is employed, that free circulation of still or agitated air be provided. When air-cooling of individual bars or forgings is not practicable, the furnace charge should provide for some means of separation, such as racks or spacers.

If you would care to know more about normalizing, or any other phase of heat-treating, you are invited to consult with Bethlehem metallurgists. They have had long experience in such matters, and they know how each treating method affects the various alloy steels. They are always glad to give you any help you need.

And when next in the market, please remember that Bethlehem makes the full range of AISI standard alloy steels, as well as special-analysis steels and all carbon grades. We can furnish what you need.

If you would like reprints of this series of advertisements from No. 1 through No. XX, please write to us, addressing your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa. The first 20 subjects in the series are now available in a handy 36-page booklet, and we shall be glad to send you a free copy.

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BETHLEHEM, PA.

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BETHLEHEM STEEL

THE IRON AGE
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The IRON AGE

July 25, 1957—Vol. 180, No. 4

Digest of the Week in

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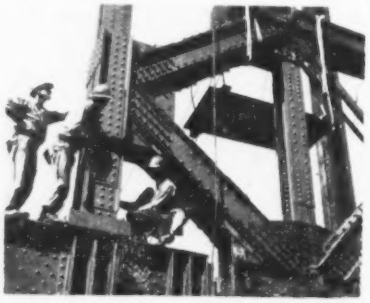
NEWS ARTICLES

BUILDING CODES

Progress Favors Metals—More cities and municipalities are bringing their building codes up to date. The result: A bigger market for metals for curtain walls. Big bone of contention is fact that older codes specified masonry backings, making metals too costly. P. 67

FABRICATORS

Breathing Space—Backlogs for steel fabricators are still long, but improved delivery of steel plates



and structurals eases the situation. Some softening of the market is noted, but highway program is due to come through. P. 69

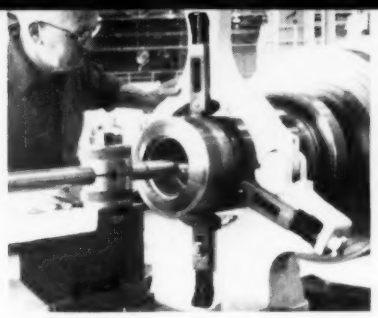
JONES & LAUGHLIN

Up to Adams—New president of J & L is out to gain new, more profitable markets. Here's a rundown of steps taken to date, with hint of future moves. Company is willing and able to make new acquisitions. P. 72

FOREMAN FEATURED

His Role Increases—Today man-

Metalworking



SHARP MACHINING: There are other aspects besides costs in successful machining operations. This Westinghouse machinist deserves the best in specifying machining techniques. It's the small details that will make the job easier and more efficient. P. 113

agement is giving an ever more important role to the first-level supervisor. Survey shows he's quizzed on contract clause changes, may interview in job hiring and often can recommend discipline. P. 74

SAFETY PAINT

Developed by Ford—Frames and other parts are painted in new water base paint. It's non-flammable and emits no dangerous fumes. Ford worked two years developing it. It's competitive in cost with other paints. P. 84

FEATURE ARTICLE

HOW TO GET MORE FOR YOUR MACHINING DOLLAR

Ferrous Metals—Modern machining is a neat balance between costs, machining efficiency, and quality. This special 16-page feature in the continuing 'Dollar' series points out some of the techniques needed to achieve the highest quality consistant with the lowest price. P. 113

MACHINING STAINLESS

Proper Combination—To successfully machine stainless you've got to select the proper tools and proper lubricants. But more than that, the cuts you take are generally going to be a bit heavier and are going to require a higher powered motor. Fortunately, the producers and users of stainless have done a rather thorough job of solving stainless machining problems. Whether the job involves turning, drilling, tapping, milling or reaming, these pointers will make the job easier and more efficient. P. 114

MACHINING STANDARD STEELS

Microstructure Counts — Many facets of efficient machining are linked directly to the metallurgy of the particular steel. Then, too, there are such factors as the condition of the machine, proper tooling, optimum speeds and feeds, and the use of suitable cutting fluids. The standard steels, plain carbon, free machining, low alloy, may be easier to machine than stainless grades; but don't let this fact interfere with your search for cost savers. These are some tips that may prove helpful. P. 122

MARKETS & PRICES

STEEL IN PLANES

Higher and Faster — New jet planes and missiles need new materials to meet awesome heat problem. Research on materials now has priority over aerodynamics. Steel, particularly stainless, has a growing future as planes fly higher, faster. P. 70

AIRCRAFT CUTBACKS

Their Effect Registers — Plane builders have found the Air Force really meant what it said about reducing plane procurement. As a result many of them are already making moves to convert to other forms of production. P. 73

POWDERED ALUMINUM

For High Temperatures — New aluminum powder metallurgy products developed by Alcoa will operate at as high as 900°F. It is expected to open doors to many new uses. P. 76

SPEED DIE CHANGES

Whole Setups Are Answer — Time out for die changing can be sharply reduced with new presses permitting fast shifts. Trick is to have a whole new setup ready on extra bolster plates. P. 93

STEEL INVENTORIES

Nearing Bottom?—Mills say there are growing signs that steel users' stocks are low. This should strengthen fourth quarter. P. 145

NEXT WEEK

AUTOMATION

A Future in Steel Mills — Card program controls and data processing systems are being applied to rolling mills at a terrific rate. Next week's feature will tell what these advances mean in the way of quality, production, and costs.

this ERIE press speeds extrusion

Presses like this—made expressly to extrude graphite electrodes—are routine specialization for Erie Foundry Company. This 450-ton press is now performing in the field, in typical trouble-free Erie fashion, providing faster extrusion work. The bed plate, rigidly attached to the press, eliminates the need for lining-up at our customer's plant, and assures continued accurate alignment. Die changes can be made in a matter of minutes by removing the clamp nuts and separating the half clamps by cranking.

Smoother Tamping Action

The operator controls the action of this Erie press smoothly and accurately by moving a hand lever in the same direction the ram travels. The further the lever is moved from vertical, the faster the ram travels . . . no other control valves are required. Fast advance and reverse speeds are achieved by auxiliary cylinders.

A similar carbon extrusion press rated at 2000 tons is now being assembled in the Erie Foundry Company plant. We invite you to see this press.

Erie Foundry Company would like to quote on your requirements. Please write

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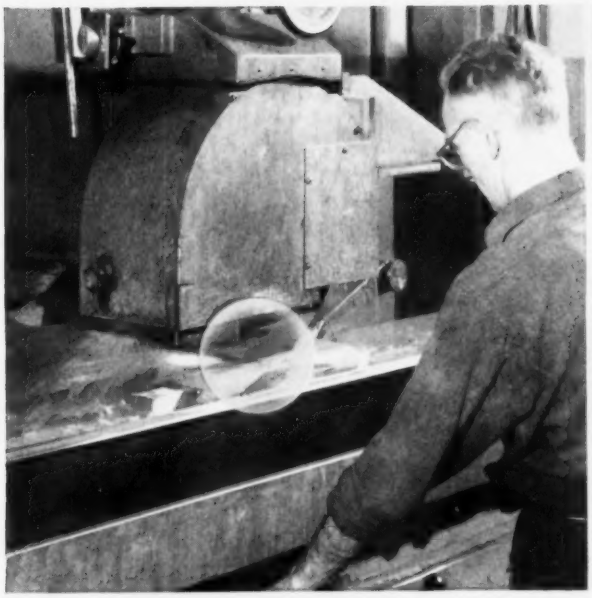
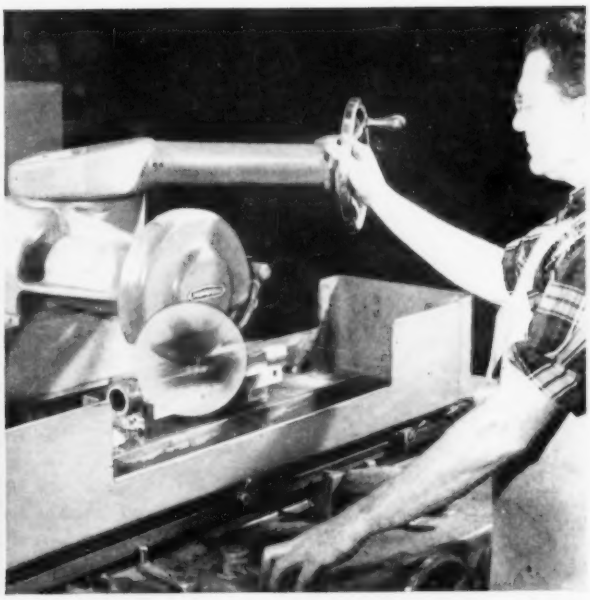


ON BIG SURFACE GRINDERS, like Blanchards, Hanchetts, Mattisons, Thompsons and Hills, G BOND-32 ALUNDUM wheels bring you many "Touch of Gold" advantages. Such as cooler, faster cutting action . . . heavier cuts without burning . . . closer tolerances and smoother finishes . . . less dressing and more pieces per dressing . . . more work, and more kinds of work, per wheel.



ON SMALL SURFACE GRINDERS, including toolroom machines, G BOND-32 ALUNDUM wheels give you the same value-adding, cost-cutting benefits. They're ideal on grinding machines like Brown and Sharpes, Crystal Lakes, Deltas, Doalls, Gallmeyer and Livingstons, LaSalles, Reids, Sanfords, Taft-Peirces, Nortons and many others.

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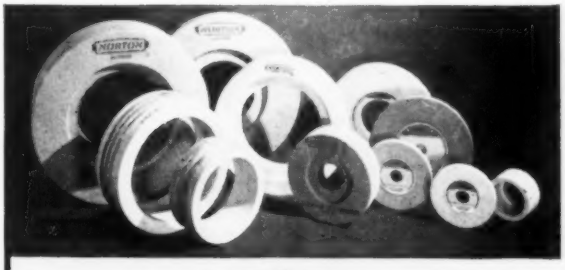
*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries



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Social Conscience Is It Being Overworked?

Some industrialists may be going overboard listening to their social conscience. Of course they owe society something. All of us do. And, of course, the Golden Rule is tops for management. It is good for the rest of us too.

Many business leaders believe they have a definite responsibility to God: To use His gifts in such a way that they will bring the highest moral and economic benefit to society.

Why such deep and serious thoughts? Probably the current Senatorial investigation of "administered" prices stirs them. This hearing is old in the sense that for more than 50 years industrialists have trekked to Washington at the "invitation" of Congress.

Semantics may seem to have changed the reason for such hearings. But the general picture is still the same. Industrialists are accused—by inference at least—of: charging too high prices, being monopolistic, ignoring their responsibilities or gouging the people.

Sooner or later some member or members of the committee seem to insinuate that: the businessman isn't fair to labor, to the people, to customers or to our future generations. He is put on the rack and questioned. The experts have been put "on" before him. The stage has been set with supposed "facts"—many of which are nothing but strongly held opinions that may or may not be the result of thought, experience or valid background.

It is this being placed on the rack that often seems to brainwash some intensely dedicated business people. They tend to lose their honestly held convictions. Being on the defensive they are seldom cheered. They are sneered at cunningly. They are baited continuously—though professionally.

It is getting so profit is a bad word. Wages are Knights in Shining Armor. They are kowtowed to, hardly ever questioned and never called nasty.

If management is honest and tries to do its best by its workers, its owners and the public, it need have no pains of an over-stimulated conscience. Its main job is to make a profit which is still allowed by the Bill of Rights.

The industrialist owes it to himself, to his company, to his employees and to his God to be the best manager possible. To do this he must do what he was hired to do: run the business so it will safeguard all the various confidences placed in him.

Sound management needs no apology!

Tom Campbell

Editor-in-Chief

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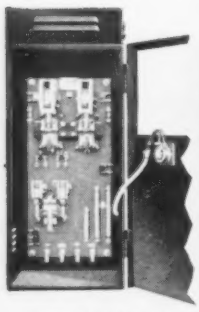
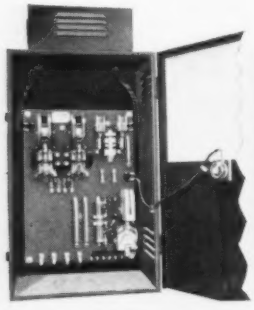
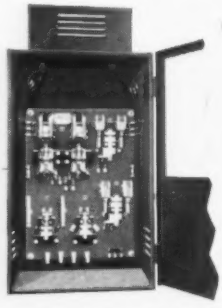


Type AD Standard Controller for single magnets or two magnets in parallel. Exclusive, adjustable discharge for different type loads



Booster Controller gives increased pull-away power from pile, then carries load at reduced current



High Speed Release DLM-335-A Controller reduces the discharge time of deep-type magnets 50%

***Bulletin 905** gives complete description of EC&M Controllers for use on lifting magnets of all types and makes*

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A DIVISION OF THE SQUARE D COMPANY
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Military View

Sir—I would appreciate it if you would send me a reprint of the article, "Success in Business Takes More Than Urge to Get Ahead," published in your July 4 issue.

Change the word "Business" in the title to "The Military" and you'll find the advice equally applicable.

I plan to pass the article around to other officers in my office.—Col. A. J. Sockoloski, QM Section, Second US Army, Fort George G. Meade, Maryland.

Face Facts

Sir—Your June 6th article "Let's Make Sense In Our Depreciation Policies" is enlightening. However, the secret to this depreciation problem lies in each company making plans to do something about the depreciation problem and not in waiting on governmental action.

Business might as well face the facts. The solution of this problem lies in a study by each company of its requirements, in the way of money, for replacement and modernization.

Average Out — Each company should estimate its requirements for modernization, and supplement the depreciation recovery with a sufficient amount from profits, after taxes and before dividends — to finance modernization. This should be a long-range program so that in good years the set-aside would be greater, but over the years would average out to meet the estimated requirements.

The government will not recognize this reserve for tax purposes, but it is very probable that the government would, in time, recognize the reserve as a liability in determining the net worth of the company and determining dividend payments.—C. M. Bull, Chief Engineer, Pidgeon-Thomas Iron Co., Memphis, Tenn.

Vacuum Melting

Sir—Anent G. G. Carr's article "Big Gains in Vacuum Metallurgy" (July 4, p. 43), Vacuum Metals Corp., Div. of Crucible at present operates two vacuum melting furnaces, one at 2500-pounds and another at 600-pounds. Both are National Research Corp. units.

The 600-lb furnace poured its 1000th heat last December, and the 2500-lb furnace was first tapped in late 1955.

Upon completion of the VMC Div.'s $1,500,000 expansion program, now underway at Syracuse, N. Y., Crucible's capacity for the production of vacuum melted materials will be doubled. The program includes the new 300-lb furnace referred to in Mr. Carr's article.—L. J. Murphy, Mgr., Public Relations, Crucible Steel Co. of America, Pittsburgh, Pa.

Not Greedy

Sir—I have no wish to be greedy but the article, "Success in Business" by Mr. Fairless is so excellent that I would like to have 100 copies of it.—A. J. Suiter, Pres. & Gen. Mgr., U. S. Supply Co., Kansas City, Mo.

"You'll like the supe. He always has a kind word for everyone."

SURE AID TO NEW PRODUCTION RECORDS!

These fast-moving days of new ideas, bigger orders, and harder competition call for "new talent" on your assembly line. A new fastener and its more exacting application to your special need may provide the specific "talent" you need.

That fastener is probably waiting for you . . . in the great variety of Southern Quality screws and bolts on hand for prompt shipment to you—from factory or from a Southern warehouse near you.

Pass your problem on to us. Samples and Stock List free upon request. Write Southern Screw Company, Box 1360-IA, Statesville, N. C.

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Monkey Beesness

Here's a switch. A queen bee chose a 50 hp motor as a new home for her colony of more than 20,000 bees recently. And thus delaying the shipping plans of General Electric's Small A-C Motor and Generator Department.

The bees were finally rerouted to a new residence through the efforts of employee George Strait (see cut), an amateur apiarist, who

Putting the bee on the bee.

took the motor apart and removed the queen.

Ironically, the motor is to be shipped to a Cincinnati tool builder as the power source for a machine. The machine was destined for, of all places, GE's plant.

Hang It On The Wall

Never a week goes by without a request for the original of one of the cartoons that dot the pages of your f.f.j. One reader will want one for framing, another to reproduce in a house magazine. Just in case one has caught your eye and you wonder what the score is we'll set down the rules here.

Incidentally, they don't apply to the "Bull of the Woods."

Originals of the one-column cartoons may be had for the asking on a first-come basis. Our agreement with our cartoonists allows us to give permission to reproduce them in house magazines, at no charge. Magazines which are sold to subscribers, or which carry advertising, may not reproduce them for free, must clear with and reimburse the cartoonist.

New Puzzler

Mr. McCleod, vice president of a large New York bank, was obliged to go to Chicago to deliver an important batch of papers which could not be entrusted to a messenger.

Arranging to take the sleeper at midnight, he left the papers in the vault at his bank until he was ready to leave. Before he went to the train he called at the bank where he was met by the night watchman.

Mr. McCleod explained his mission to him. He, McCleod, arranged his papers in his brief case and was about to depart when the watchman addressed him. He said, "Mr. McCleod, sir, I don't think you ought to go to Chicago." "Why not?" asked Mr. McCleod. "Well," said the watchman, "it is a strange coincidence. Last night I dreamed that you were called to Chicago and half way there your train was wrecked and you were killed. Really, sir, I beg of you not to go. I feel it will be fatal."

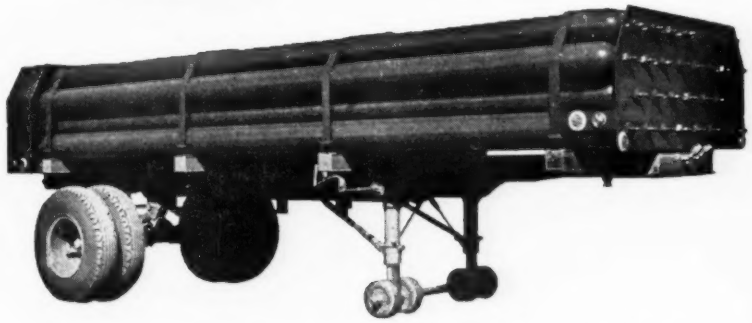
Mr. McCleod, realist that he was, not holding with superstitions of the night watchman nor affected by the findings of dream psychologists, smiled indulgently, patted the watchman on the back, left the bank, boarded the train and duly arrived in Chicago.

As soon as he rose from his berth he went to a telegraph office and telegraphed back to the president of the bank in New York. "Fire the night watchman."

Why did he order him fired?

with **INDEPENDENT**
Gas Supply TRAILERS

TRANSPORTING — Argon — Carbon Dioxide — Helium — Nitrogen — Oxygen — Boron Trifluroide — Hydrogen — Ethylene. Trailer capacities from 187,000 cu. in. to 750,000 cu. in. water capacity. Trailer tubes ICC3A-2400 Specifications with 2400 PSIG Working Pressure.



Sizes and weights to meet all State requirements.

Can be mounted on bases for permanent storage.

INDEPENDENT ENGINEERING CO., Inc.
CONSULTING · DESIGNING · RESEARCH
O'FALLON 4, ILLINOIS

Get BRASS that "fits your specs"

...as well as your "specs" fit you

Needs of Brass fabricators vary as widely . . . and as individually . . . as their own prescription eyeglasses. And Bristol is notably successful in fitting Brass to each customer's own peculiar needs with this same prescription exactness.

This could only be true of a compactly organized mill in which all customer-contact men have *both* mill and sales experience. It's not often that you find this situation. And it's not often that you find Brass made by the most modern methods to toughest old-fashioned standards of quality.

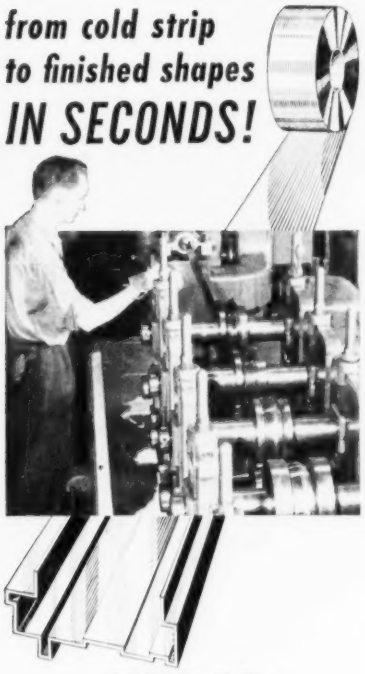
Next time you need strip, rod or wire . . . try Bristol Brass. You'll get the clearest picture yet, of what Brass can do for your product.

and for BRASS FORGINGS, too . . . get them from . . . ACCURATE BRASS CORP. (*Subsidiary of The Bristol Brass Corp.*) now in a new and modern plant at Bristol, Conn.

The **BRISTOL BRASS**
CORPORATION
Since 1850, makers of Brass strip, rod and wire in
BRISTOL, CONNECTICUT

Bristol Brass has offices and warehouses in Boston, Buffalo, Chicago, Cleveland, Dayton, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Rochester, Syracuse.

from cold strip to finished shapes
IN SECONDS!



YODER ROLL-FORMING MACHINES

If you are in the business of manufacturing a product that is, or could be, made wholly or partly from flat rolled metals in thicknesses up to ½", a Yoder Roll-Forming machine can help reduce your production costs.

Cold-formed shapes of every description —including structurals, tubular products, moldings, trim, roofing and siding, panels, cabinet shells, etc., can be produced on Yoder cold-roll forming equipment at the rate of 25,000 to 50,000 feet per day at a conversion cost of only a fraction of a penny per foot! With speeds and costs such as this, even part-time operation of a Yoder roll-forming line is a profitable investment!

Additional operations such as welding, coiling, ring forming, perforating, notching, embossing or cutting to length can be simultaneously introduced to the basic shape at little or no additional labor cost. Yoder engineers are at your service in explaining the advantages of roll-forming for your individual needs.

A new, revised, Fifth Edition of the Yoder Cold-Roll Forming book is just off the press. In addition to economic and mechanical possibilities of cold-roll forming, it contains numerous illustrations of end uses and applications of roll-formed shapes. Write for your copy today.

THE YODER COMPANY
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ENGINEERING **YODER** MANUFACTURING **COLD ROLL FORMING MACHINES**

EXHIBITS, MEETINGS

Packaging & Handling Show—Oct. 28-31, Atlantic City. (SIPMHE, One Gateway Center, Pittsburgh 22.)

Metal Show—Nov. 2-8, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

AtomFair '57 — Oct. 28-31, New York. (Atomic Industrial Forum, 3 E. 54th St., N. Y. 22.)

AUGUST

Society of Automotive Engineers—West Coast meeting, Aug. 12-15, Olympic Hotel, Seattle. Society headquarters, 485 Lexington Ave., New York.

American Institute of Electrical Engineers—Pacific general meeting, Aug. 28-30, Chinook Hotel, Yakima, Wash. Society headquarters, 33 W. 39th St., New York.

SEPTEMBER

National Metal Trades Assn.—Eastern plant management conference, Sept. 8-11, Essex - Sussex Hotel, Spring Lake, N. J. Society headquarters, 337 W. Madison St., Chicago.

American Mining Congress—Metal mining and industrial minerals convention, Sept. 9-11, Hotels Utah & Newhouse, Salt Lake City, Utah. Society headquarters, 1200 18th St., Washington, D. C.

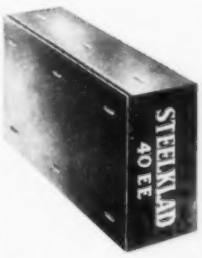
Instrument Society of America—12th annual instrument-automation conference and exhibit, Sept. 9-13, Cleveland Auditorium, Cleveland. Society headquarters, 313 Sixth Ave., Pittsburgh.

National Petroleum Assn.—Annual meeting. Sept. 11-13, Traymore Hotel, Atlantic City. Society headquarters, 958 Munsey Bldg., Washington.

Marking Device Assn.—National meeting, Sept. 19-20, Roosevelt

(Continued on P. 16)

STEELKLAD BASIC BRICK



for the Steel Industry

Grefco's steel-plated basic brick are made with the steel plate as an integral part of the brick. The brick can be manufactured with the steel plates on two, three or four sides under Grefco's patented process. In addition, plates can be molded within the brick body. This is Grefco's new STEELKLAD EE Brick.

This plating tends to make the brick more resistant to spalling. The metal in the plate oxidizes and combines with the refractory, bonding adjacent bricks together and materially increasing their life even under the severest conditions of service.

STEELKLAD brick are offered in types to meet all steel plant service conditions. They are shipped from Grefco's Baltimore, Maryland and Los Angeles, California plants. A new basic brick plant and complete laboratory are under construction at Gary, Indiana. This modern facility will serve industry in the Chicago and Midwestern areas. Consult your Grefco representative for full information.

GENERAL REFRACTORIES CO.
Philadelphia 2, Pa.

•

A COMPLETE REFRACTORIES SERVICE

GENERAL REFRACTORIES

Does Your Competition Make a Better Product with HIGH VACUUM

If you feel the sharp edge of competition slicing away at some of your best customers for your metals or metal products, perhaps high vacuum is your answer. For nothing improves the finish, increases the strength, and extends the life of metals more than vacuum processing. It can cut your costs, too.

You can advance your vacuum metallurgical research and quality control program by 17 years . . . that's how long we have been in the business of making high vacuum equipment. Our broad experience will help you decide now how vacuum metallurgy can improve your product. Weigh the results before making any investment.

Why wait until competition starts stealing your market before you find out whether vacuum metallurgy can help you? Write us now.

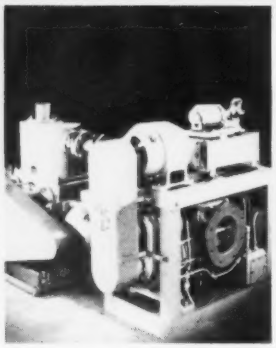
Reliable equipment for all your high vacuum needs

Cut pumping costs with less maintenance and greater dependability. Stainless body and non-corrosive parts facilitate cleaning and prevent corrosion. Complete size range from 1" to 16".

Write for bulletin No. DP-3.

Rugged new vacuum gauge with high accuracy over unusually wide range of 0.0001 — 1000 mm Hg. Thermocouple, Pirani, and hot wire ionization gauges available.

Write for bulletin No. G-3.

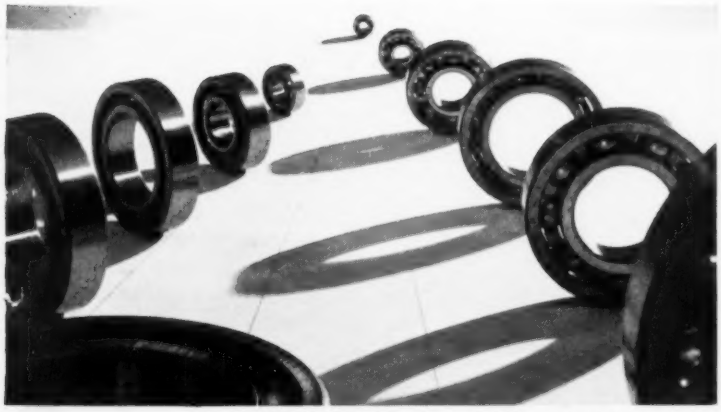


High speed vacuum pumping throughout entire micron range with NRC mechanical booster pumps. Especially suited for vacuum metallurgy capacities available from 1000 to 12,000 CFM.

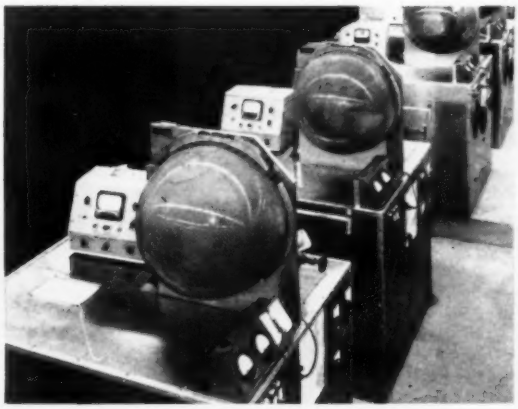
Write for bulletin No. MB-1.

Gas content of metals determined quickly and accurately with NRC gas analyzers. Measure content of hydrogen, oxygen and nitrogen as low as 1 part per million.

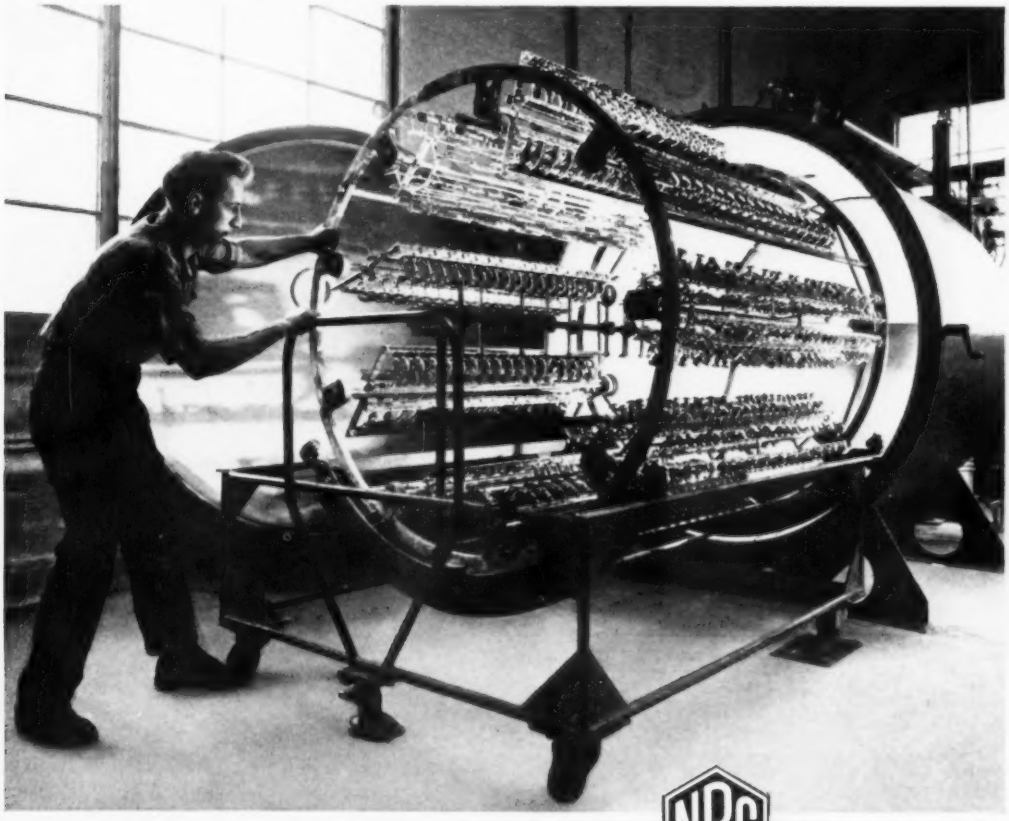
Write for bulletin No. VA-2.



Bearing life increased 600% at high temperatures and race rejects cut 90% when made of metals melted in NRC vacuum furnaces. Freedom from inclusions makes micro-finishing economical.



Get started easily with your metals research program. Units available for research, developmental or production. Choose from standard arc, resistance, or induction heated furnaces with capacities from 2 lbs. to 5,000 lbs.



Cut finishing costs as much as 75% and add sales appeal, too! Sparkling, high quality metallic finishes can be produced in a wide range of colors. Applicable to metal, plastic, wood, glass, and other materials. Write today for bulletin C3.

NRC

NRC

EQUIPMENT CORPORATION

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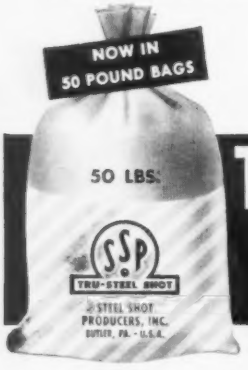
TOOL STEEL BY THE BAG?

Yes sir, 525 million pieces of round, solid, tough machine tool steel in one 50 pound bag of TRU-STEEL SHOT (S-70 size)!

TRU-STEEL is the original high carbon, fully heat-treated steel shot of **tool steel quality!**

If your cleaning operation has "machine tool" requirements — if you're doing peening, descaling of sheet or plate, or continuous cleaning of castings or other materials where you need a steel shot that is round, solid, and tough, uniformly from one shipment to the next, you'll want TRU-STEEL.

TRU-STEEL is TRUE STEEL



Write for full information on what TRU-STEEL can do for YOU in YOUR cleaning operation!

TRU-STEEL SHOT

STEEL SHOT PRODUCERS, INC. ®
Butler, Pa.
Subsidiary of Pittsburgh Crushed Steel Co.
Pittsburgh 1, Pa.

Sold by Pangborn Corporation, and by leading distributors of foundry supplies from coast to coast

EXHIBITS, MEETINGS

Continued from P. 13

Hotel, New Orleans. Society headquarters, 912 Chicago Ave., Evanston, Ill.

Steel Founders' Society of America—Fall meeting, Sept. 23-24, The Homestead, Hot Springs, Va. Society headquarters, 606 Terminal Tower, Cleveland.

The American Society of Mechanical Engineers—Fall meeting, Sept. 23-25, Statler Hotel, Hartford, Conn. Society headquarters, 1010 Empire Bldg., Pittsburgh.

Standards Engineers Society—Sixth annual meeting on standardization — economy through application Sept. 23-25, Hotel Commodore, New York. Society headquarters, P. O. Box 281, Camden, N. J.

Assn. of Iron & Steel Engineers—Annual convention, Sept. 23-26, Penn Sheraton Hotel, Pittsburgh. Society headquarters, 1010 Empire Bldg., Pittsburgh.

American Hot Dip Galvanizers Assn.—Semi-annual meeting, Sept. 26-27. Netherland - Hilton Hotel, Cincinnati. Society headquarters, 1806 First National Bank Bldg., Pittsburgh.

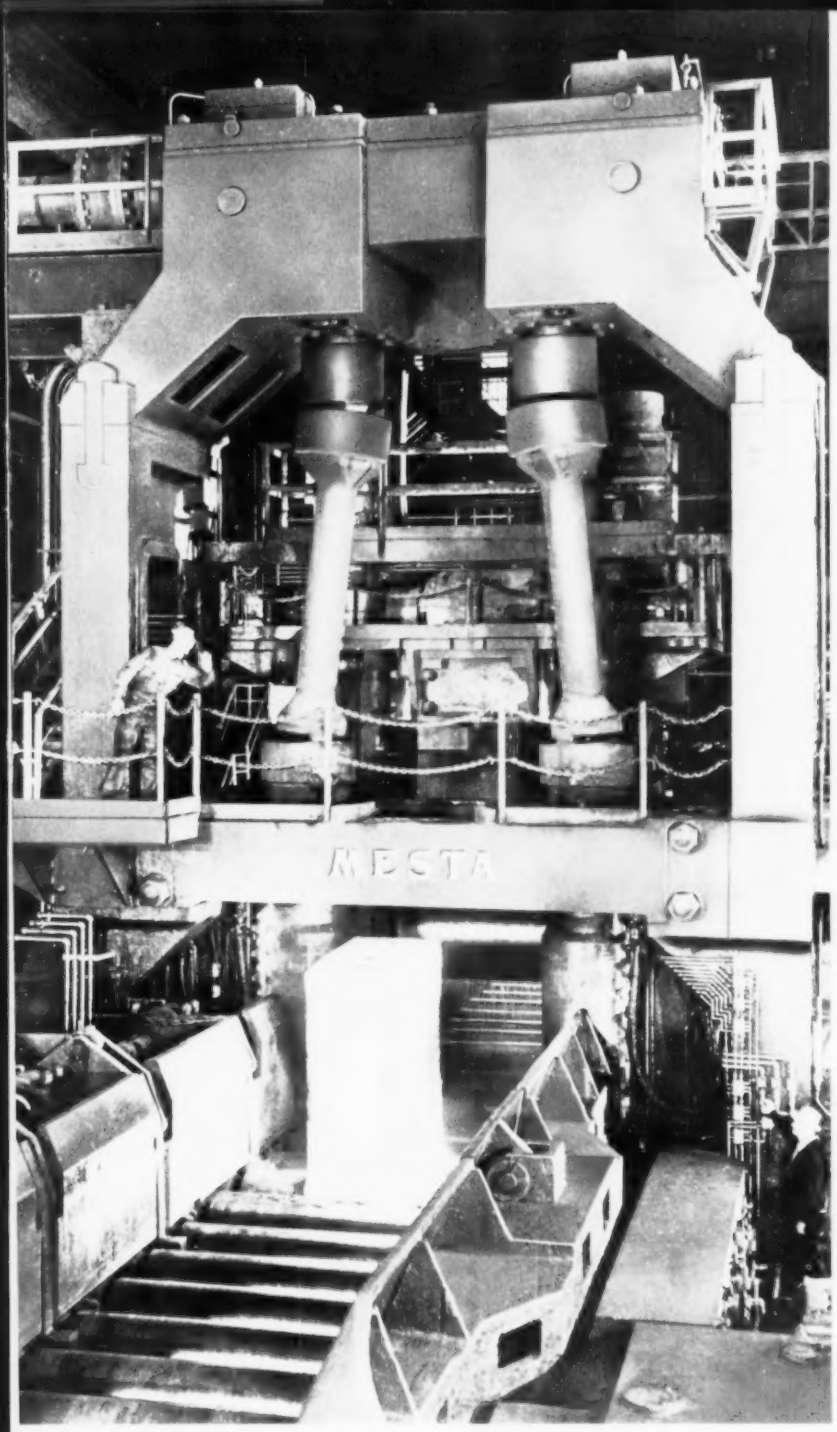
OCTOBER

The Electrochemical Society — Semi-annual meeting, Oct. 6-10, Statler Hotel, Buffalo. Society headquarters, 216 W. 102nd St., New York.

American Institute of Steel Construction — 35th annual meeting, Oct. 6-11, Hotel del Coronado, Calif. Society headquarters, 101 Park Ave., New York.

American Society of Lubrication Engineers—Fourth conference, Oct. 7-9, Royal York Hotel, Toronto, Ont., Canada. Society headquarters, 84 E. Randolph St., Chicago.

Committee on Vacuum Techniques—Fourth annual symposium on high vacuum technology, Oct. 9-11, Hotel Somerset, Boston. Society headquarters, Box 1282, Boston.



Experienced engineering and development

KEY TO HIGHER TONNAGE

...with Westinghouse-equipped reversing mills

Knocking down an ingot on schedule places heavy demands on your primary reversing mill. Drives and auxiliary equipment take rough abuse. To give you an edge in meeting demands, Westinghouse drives are engineered from long experience. New advances in Westinghouse automatic controls and coordinated auxiliary equipment keep your mill on schedule. MP-3051

YOU CAN BE SURE...IF IT'S Westinghouse

Dependability is tailor made

Experience tailors each drive

Today, reversing mill drive equipment takes heavier abuse than ever before. Growing operating and tonnage requirements can't be met by yesterday's set of standards. That's why experienced engineering at Westinghouse tailors each drive to the specific mill. In this way, you can be sure of top performance, maximum accessibility to all parts of the drive, and rugged construction quality for reliability today and long into the future.

The Westinghouse reversing mill drive, at right, is a good example. Main drive is a 12,000 hp., 40 80 rpm double-armature twin motor. Edger drive (top) is a 4,000 hp., 60 150 rpm double-armature motor. Time-saving accessibility is provided by: 1) large walk-in endbells, 2) extra space for brush accessibility, both radially and axially, and 3) absence of baffle restrictions between the commutator area and the stator or rotor windings.

Heavy-duty thrust bearings are located at the mill end of the main drive pedestal bearings to permit easy, routine inspections. Removable end-case permits complete inspection and maintenance without disturbing either journal bearing or bearing cap.

Rugged construction of the Westinghouse reversing mill drive incorporates heavy-duty bedplates supported on concrete foundations. Pedestal cap bolts and base bolts extend deep into foundation concrete. Mill-end bearings are supported by massive pedestals using foundation keys. Each armature coil is rigidly and individually braced, front and rear. Armature coil cross connections are securly encased in a steel box at the rear of the rotor and flexibly connected to armature coils.

Oscillotrol (R) thrust oil-damper system effectively damps out rotor oscillations caused by pulses from mill-spindle coupling action on twin-drive motors.

MP-3051

YOU CAN BE SURE...IF IT'S Westinghouse

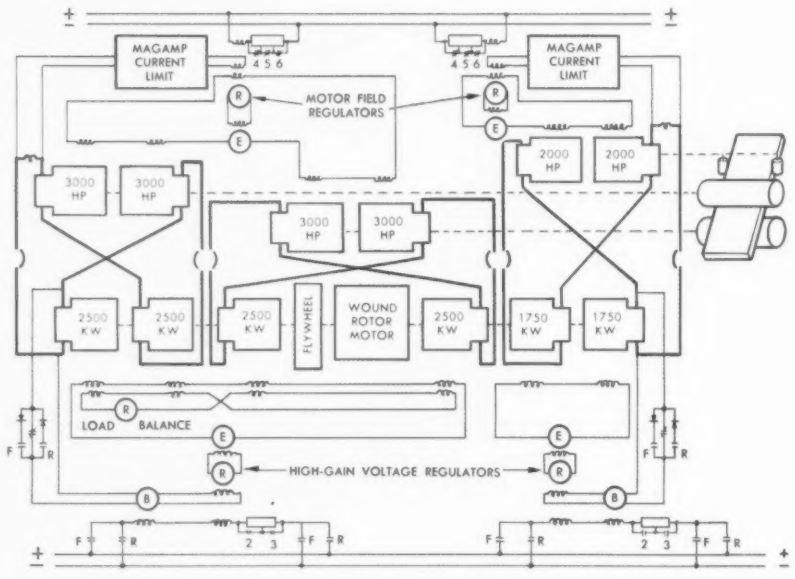
SYSTEM FEATURES

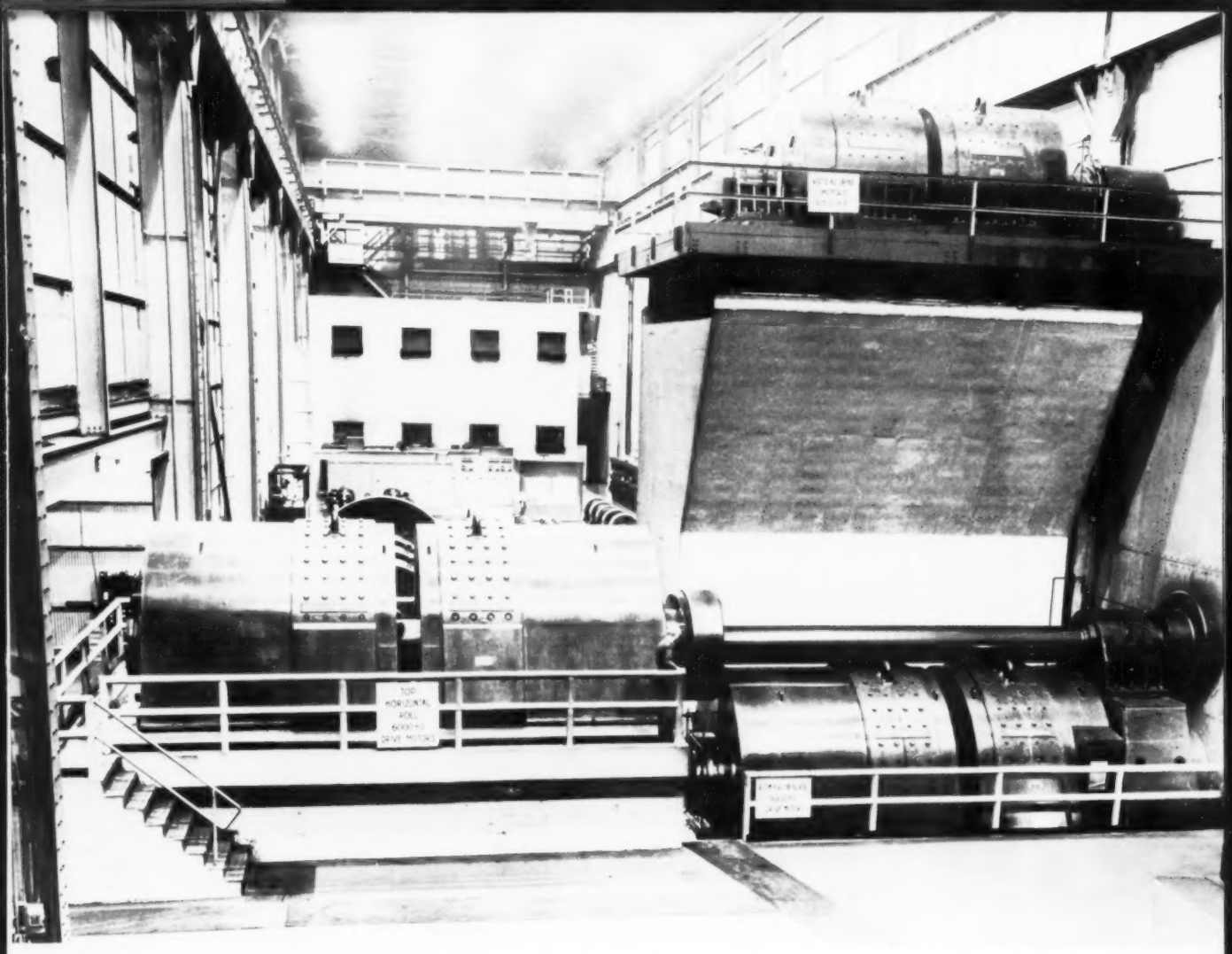
Sandwich series loops are used for each of the pairs of double-armature twin-drive motors and for the double-armature edger motor to minimize the number of circuit breakers and load balance equipment. A load balance regulator excites auxiliary fields on the 2500 kw generators to balance the twin-drive motor loads.

High-gain voltage regulators excite generators to give fast changes in response to the operator's controls.

Motor field regulators excite motors to give changes in speed by motor-field control.

MAGAMP (R) (magnetic amplifier) current-limit regulator builds up motor field strength to increase the torque per ampere for loads approaching 200%.





Typical reversing mill drive using 12,000 hp, 40-80 rpm double-armature twin motor. Edger drive (top) is 4,000 hp, 60-150 rpm double-armature motor.

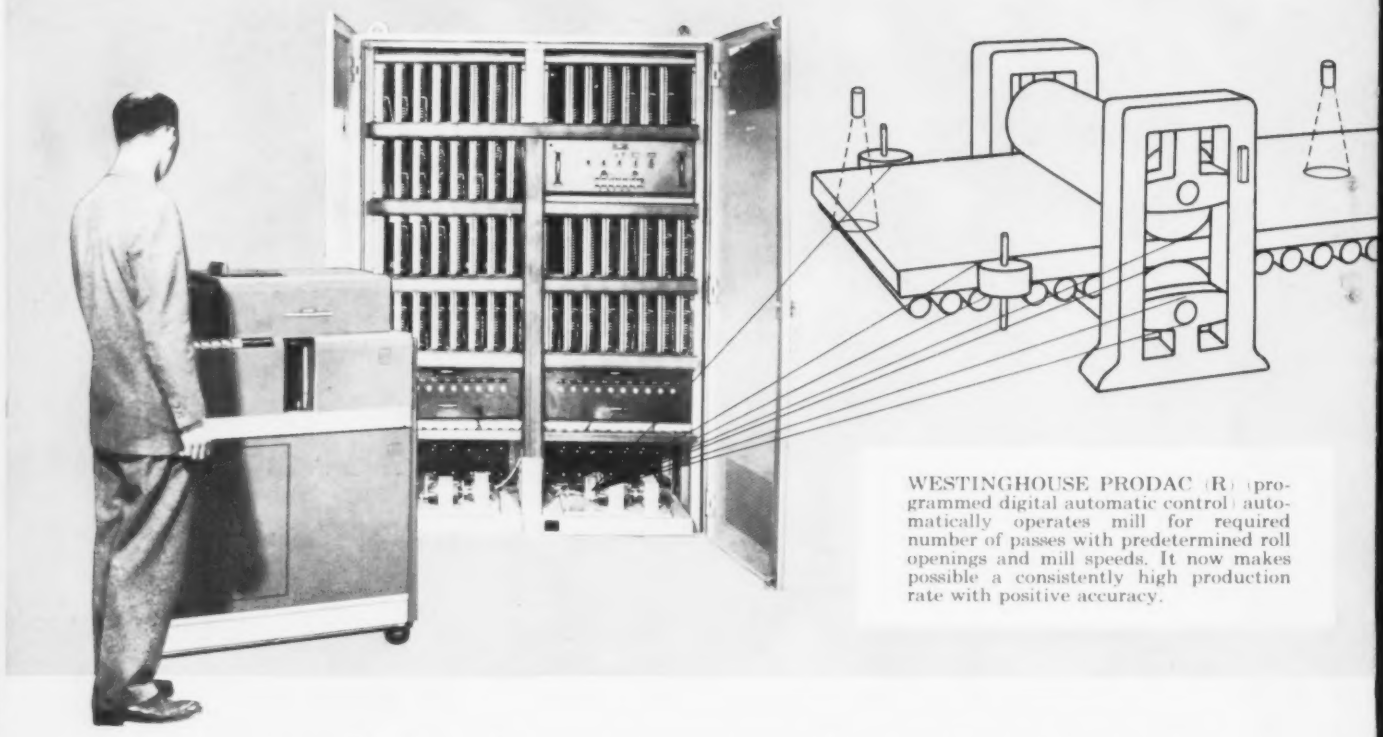
WESTINGHOUSE EQUIPMENT SERVES THESE USERS

YEAR	CUSTOMER	LOCATION	MILL	HP	RPM
1951	U. S. Steel Corporation	Fairless Hills, Pa.	40" Blooming Mill	8000*	65-130
1951	☆Sheffield Steel Division	Kansas City, Mo.	32" Blooming Mill	4000	60-150
1951	Laclede Steel Company	Alton, Illinois	35" Blooming Mill	5000	60-150
1951	Dow Chemical Company	Madison, Illinois	84" Reversing Mill	6000	55-156
1951	U. S. Steel Corporation	Morrisville, Pa.	Universal Slabbing Mill	12000*†	40-80
1951	‡Great Lakes Steel Corporation	Detroit, Michigan	Universal Slabbing Mill	12000*†	40-80
1953	Reynolds Metals Company	McCook, Illinois	144" Taper Mill	3000	125-250
1954	Inland Steel Company	Indiana Harbor, Ill.	Wide Flange Beam Mill	7000†	80-160
1955	Aluminum Co. of America	Davenport, Iowa	160" Slabbing Mill	7000*	30-60
1955	Empressa Nacional Siderurgica	Spain	132" Plate Mill	7000*	40-80
1955	Jones & Laughlin Steel Corp.	Cleveland, Ohio	Slabbing Mill	10000*	40-100
1955	Kaiser Al. & Chem. Corp.	Ravenswood, W. Va.	168" Slabbing Mill	10000*†	30-60
1955	Kaiser Al. & Chem. Corp.	Ravenswood, W. Va.	110" Slabbing Mill	6000	30-60
1955	Republic Steel Corp.	Cleveland, Ohio	Universal Slabbing Mill	12000*	40-80
1955	Jones & Laughlin Steel Corp.	Aliquippa, Pa.	Reversing Rougher	6000*	40-100
1955	Jones & Laughlin Steel Corp.	Cleveland, Ohio	Reversing Rougher	8000*	40-80
1955	Crucible Steel Co. of America	Midland, Pa.	Roughing Mill	3500	50-150
1955	Armco Steel Corporation	Butler, Pa.	Reversing Rougher	7000	40-100
1956	U. S. Steel Corporation	South Chicago, Illinois	Blooming Mill	12000*†	40-80
1956	U. S. Steel Corporation	Gary, Indiana	Universal Slabbing Mill	12000*†	40-80
1956	Altos Hornos	Mexico	Blooming Mill	6000*	40-80
1956	Large Eastern Steel Company		Blooming Mill	3000	60-150
1956	Reynolds Metals Company	Listerhill, Alabama	170" Slabbing Mill	7000*	30-60
1956	Tata Iron & Steel	India	Reversing Rougher	3500*	60-150
1956	Kaiser Steel Company	Fontana, California	90" Slabbing Mill	10000*	40-100
1956	Olin Mathieson Chem. Corp.	Omal, Ohio	96" Slabbing Mill	5000	35-70
1956	Empire Steel Corporation	Mansfield, Ohio	Reversing Rougher	5000	50-120

☆Armco Steel Corp. ‡Division of National Steel Corp. *Twin Drive †Double Armature

MP-3051

Auxiliary equipment takes over more responsibility



WESTINGHOUSE PRODAC (R) (programmed digital automatic control) automatically operates mill for required number of passes with predetermined roll openings and mill speeds. It now makes possible a consistently high production rate with positive accuracy.

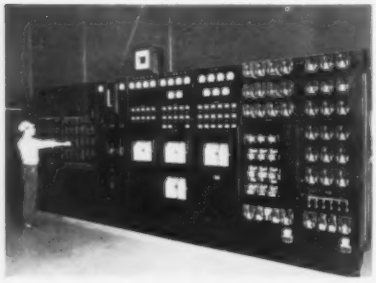
Reversing mills are more precise, automatic with Westinghouse auxiliaries

Continued research and development by Westinghouse helps to make your operations more precise and automatic. A recent example is PRODAC control. It makes possible the first completely automatic mill with card-programmed rolling information.

Unmatched Westinghouse engineering for high-tonnage reversing mill operation is at your service . . . from planning to design, installation and start-up. A skilled Westinghouse team will accept unit responsibility and work with you and your consulting engineers.

Contact your Westinghouse sales office for further details . . . Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pa.

MP-3051



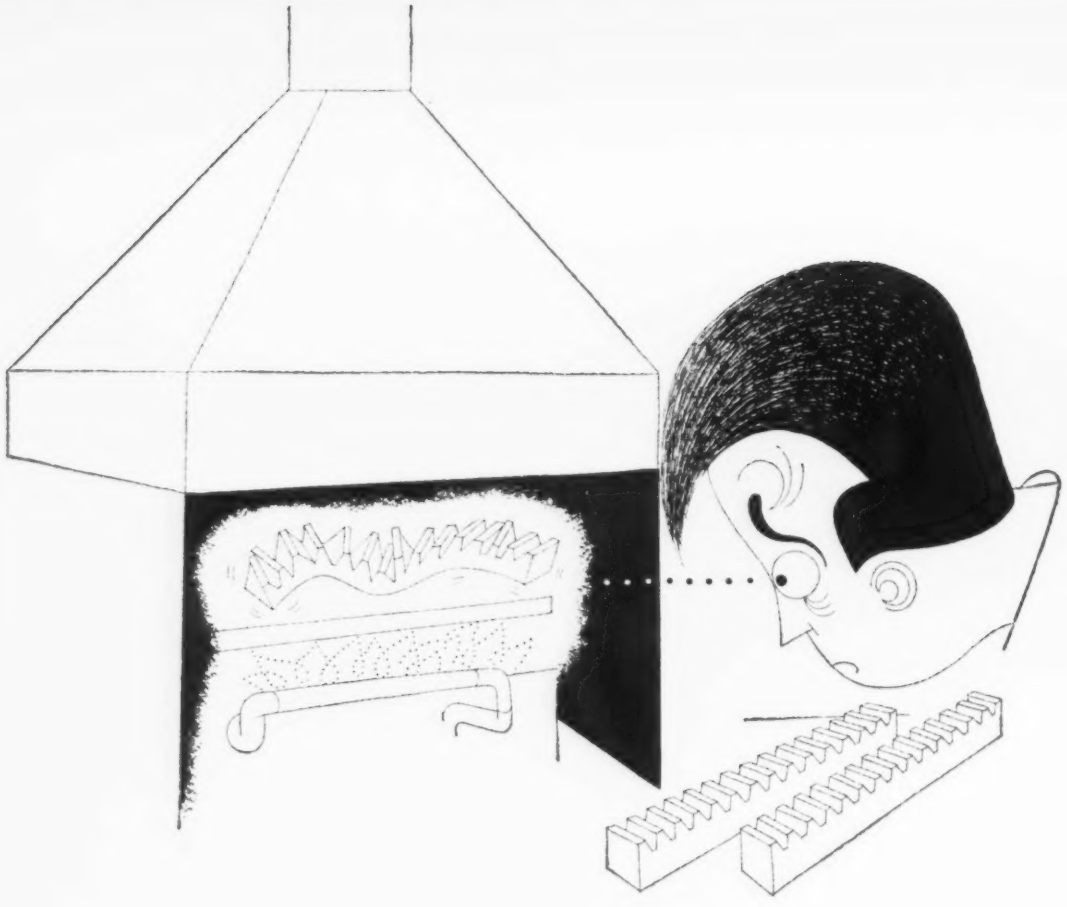
WESTINGHOUSE main-drive control panels provide centralized start-up switches for fans and motor-generator sets, and metering for power and regulating circuits.

WESTINGHOUSE variable voltage control for all auxiliaries minimizes handling time. Transfer switches and emergency bus arrangement afford relief in case of generator failure.

MCT600 INDIVIDUAL TABLE ROLL MOTOR, silicone insulated; drives mill tables directly; in ratings at 230 volts; frame sizes from 604 to 618; 3.75 hp to 50 hp, 157 rpm to 85 rpm.

YOU CAN BE **SURE**... IF IT'S Westinghouse

B-RIGHT-ON®
SOCKET SCREW PRODUCTS
always measure up!
QUALITY
B-RIGHT-ON
PRODUCTS
Socket screw users who want *what* they want *when* they want it know it pays to specify B-RIGHT-ON! Brighton Socket Screw Products *always* measure up.
Standard or special, Brighton Screws must meet and pass factory standards that are higher even than those specified by the ultimate user of the screws. Rigid control, from initial steel selection to final packaging, certifies every screw as B-RIGHT-ON quality.
Selected mill supply houses, Brighton distributors, complete the control chain, assure the user of service and delivery as dependable as the screws . . . B-RIGHT-ON service.
Write for descriptive literature . . . see how
YOU CAN DO BETTER WITH B-RIGHT-ON.
THE BRIGHTON SCREW & MANUFACTURING CO.
1829 READING ROAD CINCINNATI 2, OHIO



Distortion a problem?

Then switch to nondeforming **MAX-EL 3½** alloy steel. It's a general purpose grade that can't be beat for most jobs. And it's quickly available from local Crucible warehouses.

MAX-EL® 3½ is a high quality, free machining alloy steel that gives high strength with toughness and hardness. Yet it's well known for its ease of machining and deep hardening characteristics. In many cases there's a cost advantage in machining parts directly from MAX-EL bars which have been heat treated and stress relieved at the mill. *This eliminates heat treating after machining, and insures minimum distortion.*

MAX-EL 3½ is one of hundreds of special steels regularly stocked at all local Crucible warehouses. And Crucible warehouse service offers you unlimited help with steel problems, when you want it. For Crucible is the only specialty steel producer *fully integrated to the point of use.* That means control and responsibility from raw materials to warehouse delivery to you.

STOCKS MAINTAINED OF:
Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting Die and Plastic Mold Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el, Hy-Tuf, AISI Alloy . . . Onyx Spring, Hollow Drill Steel and other special purpose steels.

CRUCIBLE WAREHOUSE SERVICE

Crucible Steel Company of America

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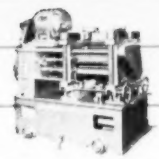
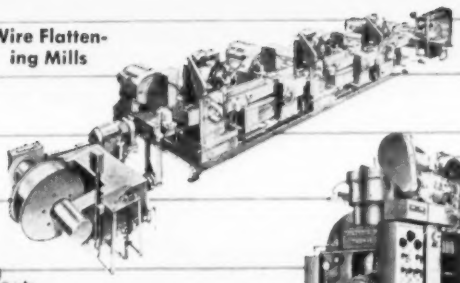
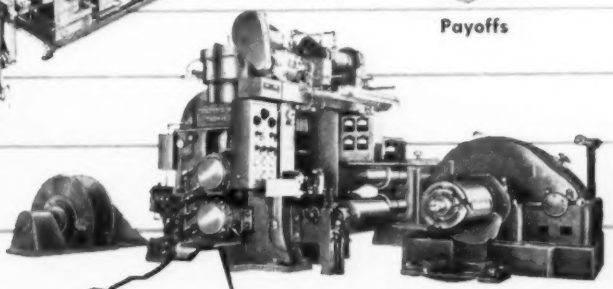


Coilers

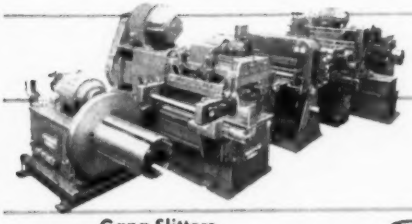


Wire Flattening Mills

Payoffs



Two High Strip Rolling Mills

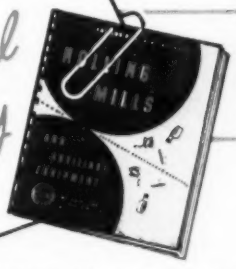


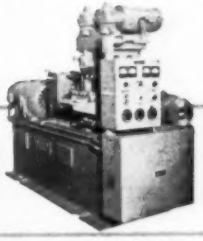
Gang Slitters

MEMO

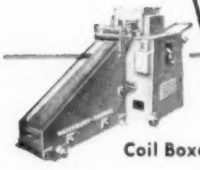
Re Rolling Mill Modernization

Look Into Latest Waterbury Farrel Mill Machinery



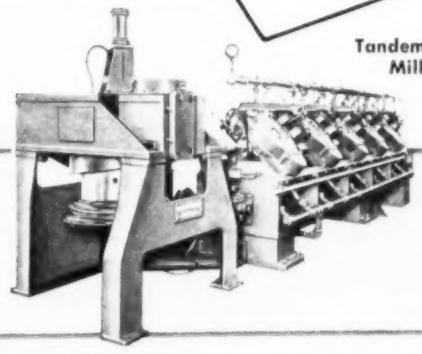


Four High Strip Rolling Mills

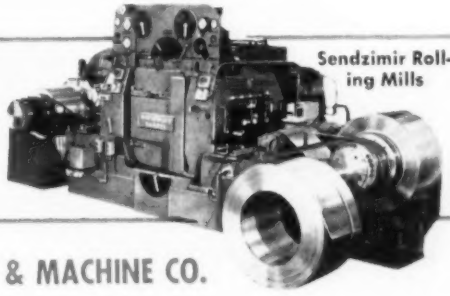


Coil Boxes

NEW, 48 PAGE MILL MACHINERY CATALOG. Gives a complete picture of the various types of mills and auxiliary equipment built by Waterbury Farrel. Send for your copy, today.



Tandem Rod Mills



Sendzimir Rolling Mills

THE WATERBURY FARREL FOUNDRY & MACHINE CO.

WATERBURY, CONN., U. S. A.

Sales Offices: Chicago • Cleveland • Millburn, N. J.

ROLLING MILL EQUIPMENT

- Four-High Rolling Mills
- Gang Slitters
- Grading Mills
- Mint Mills
- Sendzimir Rolling Mills
- Special Rolling Mills
- Two-High Rolling Mills

AUXILIARY EQUIPMENT

- Coil Boxes
- Coilers
- Coil Lifts and Transfers
- Belt Wrappers
- Edgers
- Handling Equipment
- Payoffs
- Straighteners
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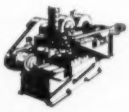
ROD AND TUBE MILL EQUIPMENT

- Draw Benches
- Tandem Rod Mills
- Three-High Rod Mills
- Two-High Rod Mills

WATERBURY FARREL FOUNDED 1857



Bolt, Nut & Screw Machinery

Power Presses

Rolling Mill Machinery

Wire Mill Equipment

Sendzimir Mills & Other Special Machinery

WF-31

The Spirit of a Company

•

How do you measure or evaluate the spirit of a company?

By physical facts — size, number of plants, number of employees?

Or by accomplishments — the amount of sales, the outstanding installations, the new products?

Or by the intangibles — the reputation, the respect of the industries served, the interest of the company in their customers?

No one ever has defined specifically the spirit of a company, yet every company with which you do business has a certain identifying spirit.

•

What is the spirit of Aetna-Standard as we see it ourselves?

The ability to do a job well.

The courage to design equipment in the face of competitive bidding without diluting the ruggedness and the extra components for the sake of a price.

The strength to pioneer in ideas.

The perseverance to say "no" when "yes" would be much easier.

The awareness of the importance of customers.

The Aetna-Standard Engineering Company

Ellwood City, Pa. Pittsburgh, Pa. Warren, Ohio.

Something new... made better by aluminum

Super-purity aluminum has helped set a new standard in gasoline performance . . . new standards in metal brilliance and workability.

From high-power gasoline to high-fashion jewelry . . . super-purity Aluminum is making news

The new third pump in filling stations across the continent is one more symbol of aluminum's amazing versatility. For these higher octane gasolines are produced by a new catalyst—made possible by super-purity (99.99+%) aluminum. And Canada's Aluminium Limited, alone, supplies two thirds of this super-purity metal used by the North American oil refining industry.

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Super-purity aluminum is also being used more and more in quality metalworking. For no other metal of such easy workability can be polished to such a brilliant and long-lasting lustre. This unique combination of properties has proven invaluable to makers of reflectors, jewelry, tableware, and decorative trim for higher priced automobiles and modern buildings.

Canada a logical source

To produce super-purity aluminum requires twice as much electric power as the commercial grade. That's why Aluminium Limited with its vast hydroelectric installations in Quebec and British Columbia is such a logical source. Once again this independent Canadian producer's natural role as a supplier of primary aluminum is serving the skills of American fabricators to create new products made better by aluminum.

Supplying U. S. industries with primary aluminum from Canada

Aluminium Limited *Sales, Inc.*

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don't lose your head!

When bearings fail, don't go to pieces... get on the phone and tell an authorized SKF distributor your troubles. He will help you put things back in order, quickly. Every authorized SKF distributor carries a complete line of SKF ball and roller bearings and pillow blocks – a type for every use – and he is factory-trained by SKF to assist you on any knotty production problems.

Call him for prompt, reliable service on all bearing requirements.

7788

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SERIES SY

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SELF-ALIGNING BALL BEARING

SINGLE ROW DEEP GROOVE

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BEARING REPLACEMENT SERVICE

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

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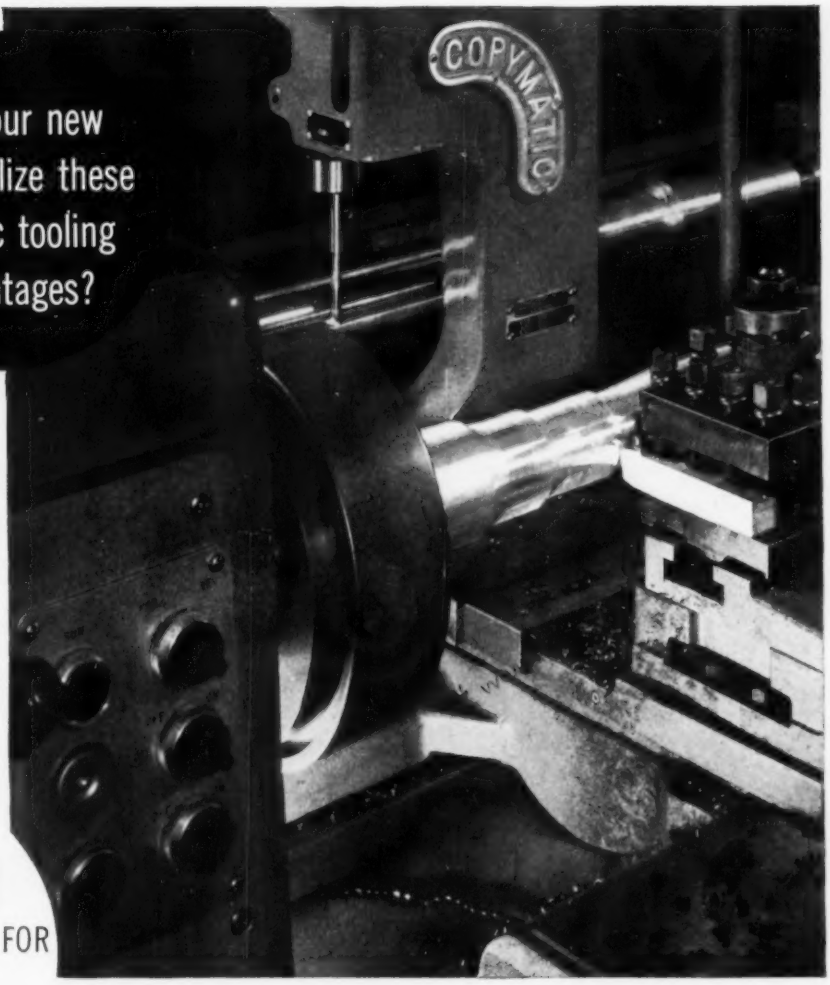
Can your new lathe utilize these ceramic tooling advantages?



...up to 2000 sfm
...30 micro-inch finishes
...turning speeds
4 to 5 times faster...
removes more metal faster
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NEW
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LATHES ARE DESIGNED FOR
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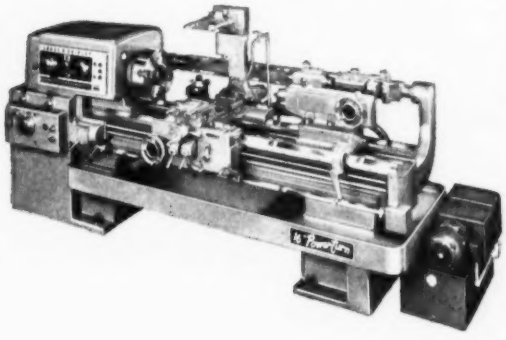
. . . adequate support for workpiece and tool

exclusive elliptical girth bed • ruggedly mounted spindle • greater carriage bearing • rigid tool mounting • wide range of feeds • hardened and ground replaceable cross-slide ways



Be ready to cash in on the promises offered by Ceramic tooling. New Lodge & Shipley POWERTURN and POWERTURN COPYMATIC Lathes are designed with the features needed to fulfill the advances offered by ceramic tooling.

You get extra speed . . . extra horsepower . . . extra rigidity, specifically designed to permit utilization of newest tooling . . . on toughest metals . . . at production rates.

For details write to The Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.

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Eastern supplies more tonnage of more types of stainless steel sheets and plates for aircraft, missiles and rockets than any other exclusive producer in the world.

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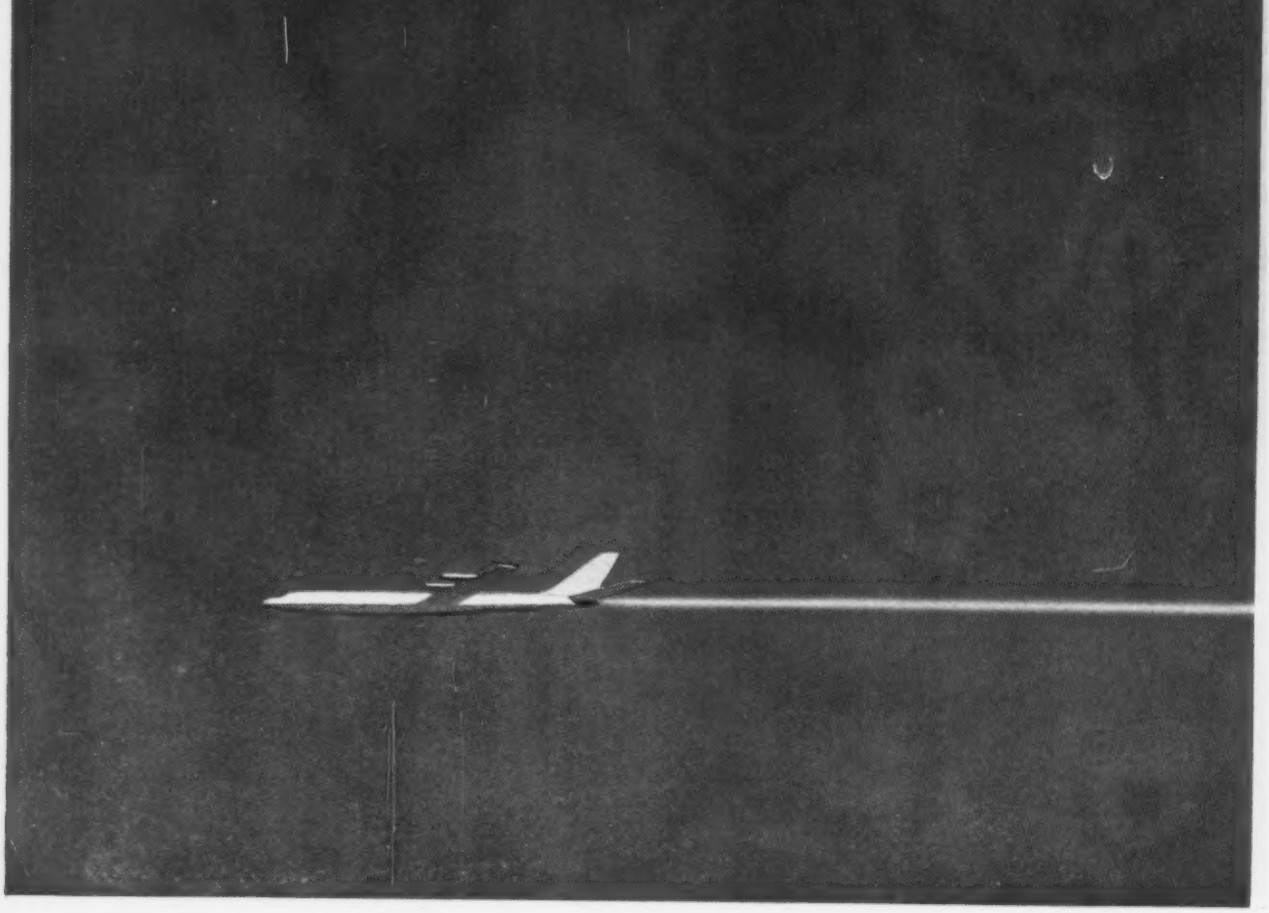
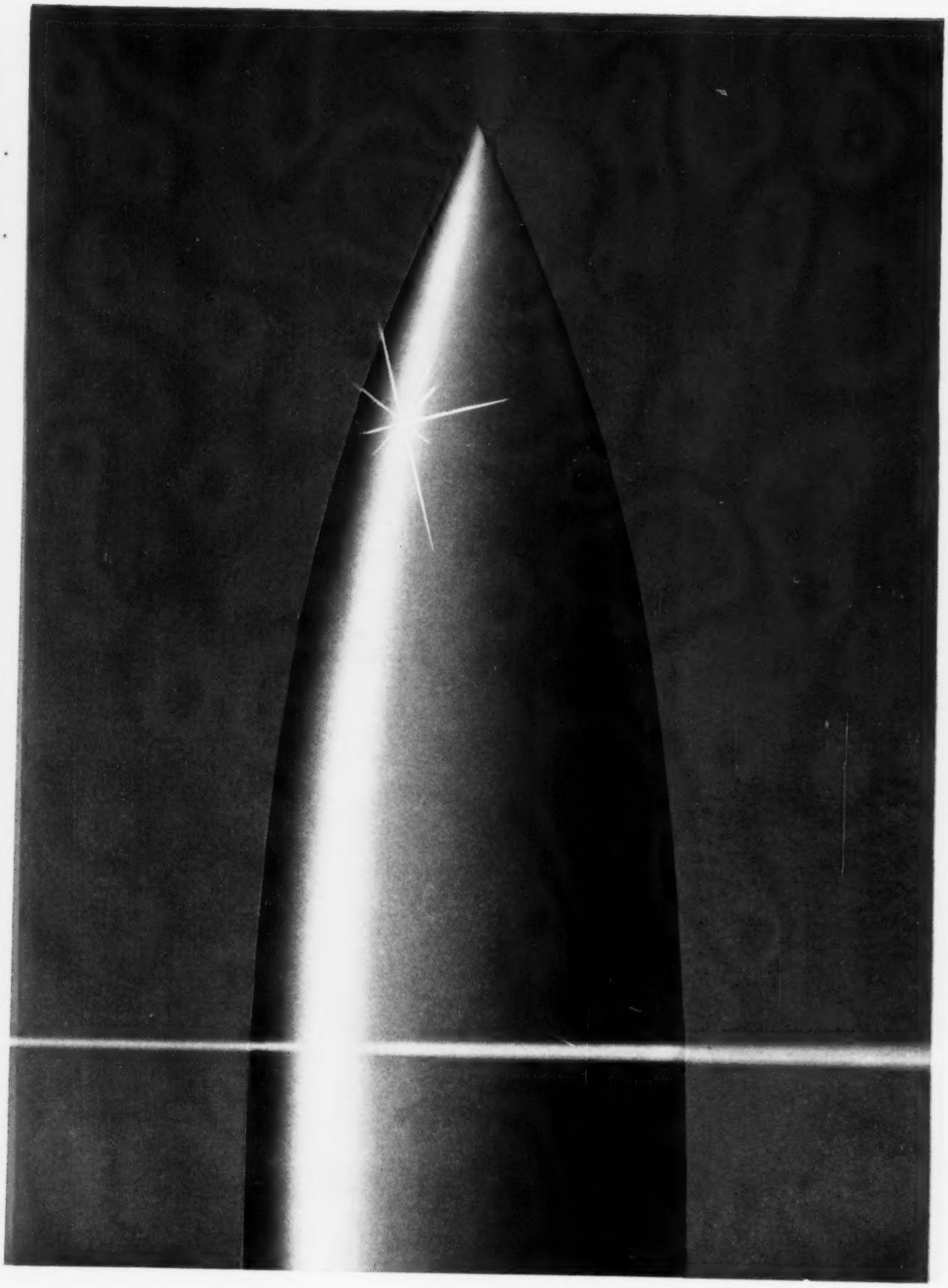




Cincinnati Press Brake Dies

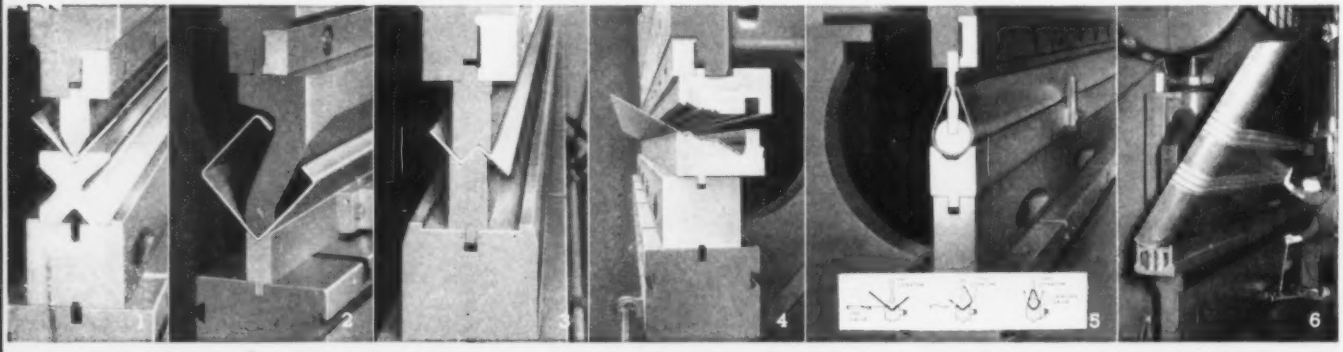
COMPLETE DIE SERVICE

The problem of selecting the proper die is constantly recurring, and many times calls for the best technical skill and accumulated experience available. The Cincinnati Shaper Company offers complete facilities for manufacturing hundreds of dies, for the forming of a variety of products. Also available are the prompt services of our Application Engineers, a department thoroughly experienced and equipped to engineer the special dies you may require.

APPLICATION ENGINEERING DEPARTMENT

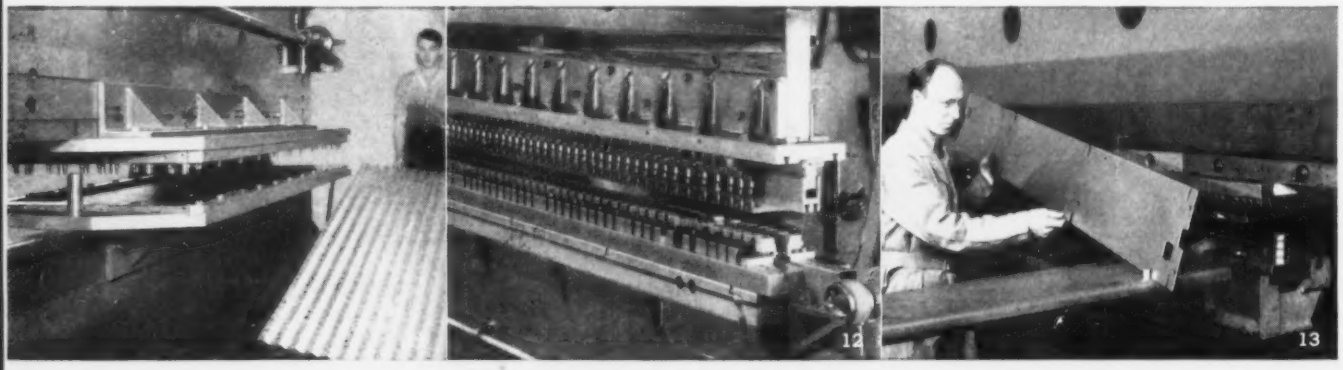
Our Application Engineers stand ready to give your production problems individual attention. They will aid you in the selection of proper punching equipment, if punching is your problem. A background of 30 years of widely varied experience is represented in this department, in literally every field associated with our machines.

To permit our Application Engineers to be of maximum service, as much information as possible should be given when sending us an inquiry or an order. Small details such as angles and radii on even the simple dies depends on such data. With complete information we will be able to make sound recommendations on methods



A typical 4-way die, equivalent to 4 single vee-dies, is shown in photo 1. Photos 2 and 3 show gooseneck and offset dies, respectively. A special die for producing 16 gauge molding is shown in photo 4.

The closed U bend shown in photo 5 is formed in 3 hits. Photo 6 shows a large truck body panel being formed.



Tooling for punching grain bin sheets is mounted on special bolsters in photo 11 Spring plungers are used for strippers. Photo 12 shows a double row punching setup. Gags are used to give different hole groupings. Four edges of a control cabinet blank are punched and notched on the setup shown in photo 13.

CINCINNATI

THE CINCINNATI SHAPER CO.

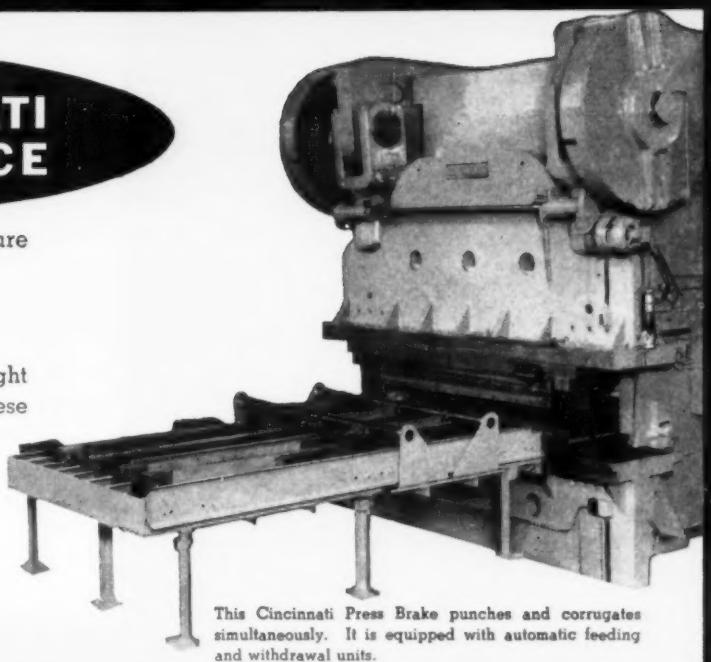
CINCINNATI 25, OHIO, U.S.A. SHAPERS · SHEARS · PRESS BRAKES

A COMPLETE CINCINNATI ENGINEERING SERVICE

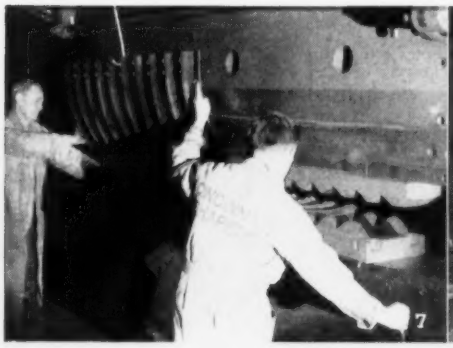
and die design, as well as an estimate of the pressure that will be required.

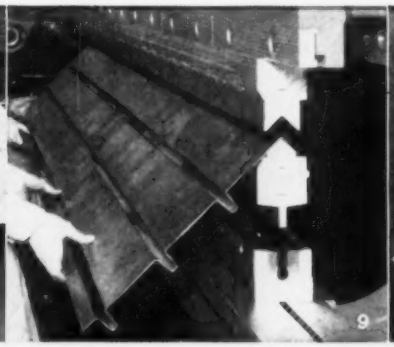
DIE MANUFACTURING

Dies cannot be classified as "standard" even for right angle bends, since there are many designs for these dies alone. Therefore, we do not stock finished dies. Instead, we carry a large stock of brake die steel. Our machining, assembling and testing facilities are ample for producing high quality, fully tested dies for any Press Brake work.

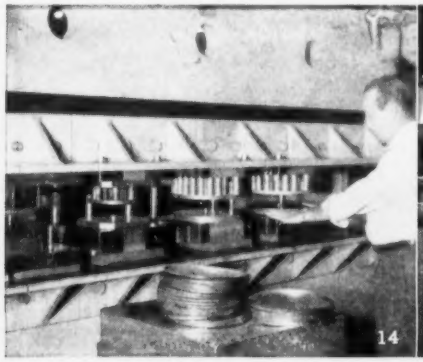


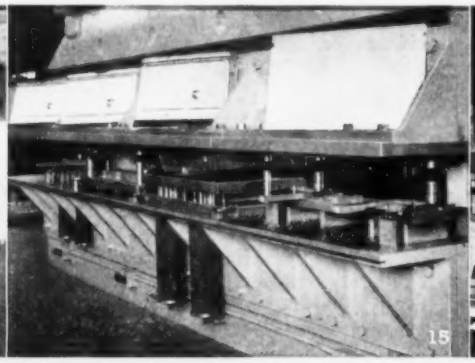
This Cincinnati Press Brake punches and corrugates simultaneously. It is equipped with automatic feeding and withdrawal units.

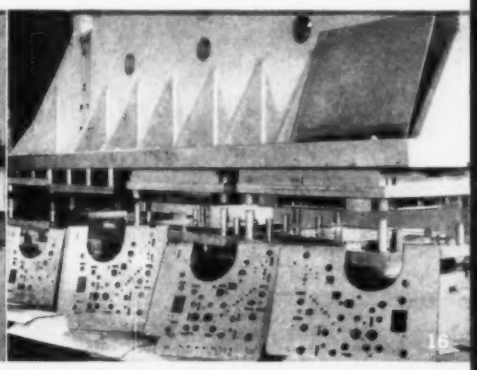




The dies shown in photo 7 form corrugated culvert sections in successive hits. Photo 8 shows conical sections being formed with standard dies. Steel roof decking is made with the "double-decker" dies shown in photo 9. The setup shown in photo 10 produces 2 miles of galvanized gutter per hour.

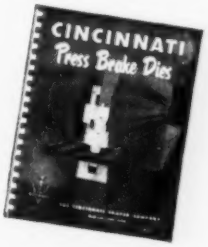






The progressive die setup shown in photo 14 is used for punching and drawing switchboard parts. Photo 15 shows a progressive die setup for making refrigerator top components. Pressure for draw operation is provided by rubber cylinders. Photo 16 shows a progressive die setup for producing television chassis.

The photos on these two pages show just a few samples of the Press Brake tooling and material-handling equipment designed and furnished by the Cincinnati Shaper Company. For more information, write Department B for Catalog D-2.



Does your **Cylindrical** *problem call for a* **Centrifugal** *solution?*

If your product plans call for hollow cylindrical parts, give some thought to these facts. Manufacturers who had never seriously considered cast parts before are discovering important advantages in Sandusky centrifugal castings.

They're getting exceptional resistance to heat, corrosion, abrasion and stress, through the use of special alloys cast centrifugally . . . in diameters from 7" to 54", and lengths to 33 feet depending on diameter . . . and specially machined to specifications.

How can our versatile staff and facilities help you? Tell us your product requirements. Let us explore your ideas. Perhaps we can help solve your cylindrical problems through the vast foundry experience, metallurgical research and machining skills our 46 years offer.

Your request will bring more information promptly . . . or, if you prefer, a personal call by one of our engineers. Sandusky Foundry and Machine Company—Sandusky, Ohio.

Sandusky centrifugal castings offer you 4 important advantages:

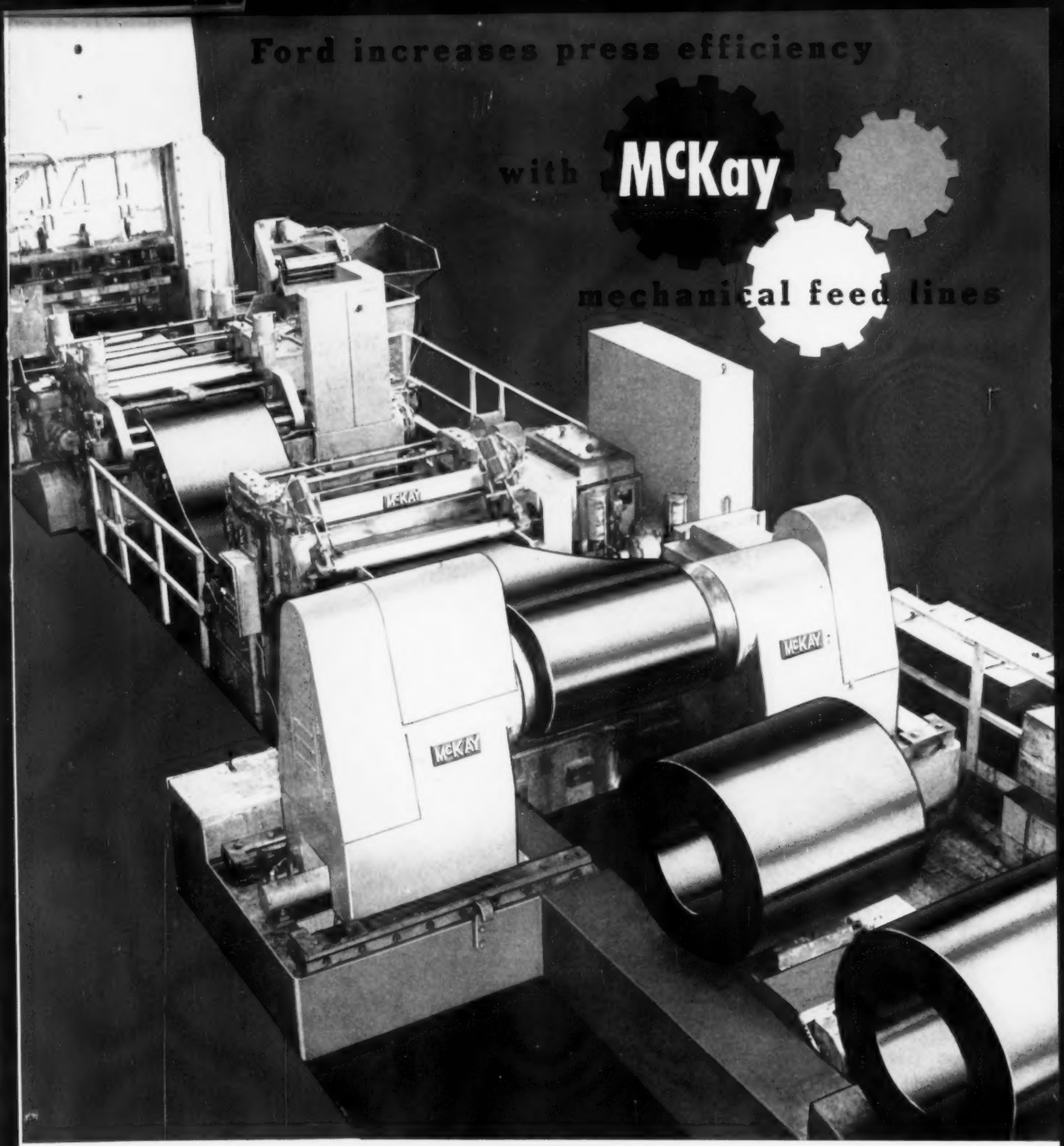
1. ***SUPERIOR STRENGTH***—through non-directional mechanical properties
2. ***BETTER QUALITY***—machined castings are porosity-free
3. ***UNIFORM SOUNDNESS***—harmful inclusions are forced out by spinning motion
4. ***JOB-READY FINISHED CASTING***—reach you machined exactly to your specifications . . . eliminating extra costs from rejects, down-time, loss of production, etc.

Sandusky Centrifugal Castings

Stainless steels—plain carbon and low alloy steels—wide variety of copper base compositions

Ford increases press efficiency

with McKay mechanical feed lines



To increase the output and efficiency of large presses the Ford Motor Company has installed a McKay Mechanical Press Feed Line that for the first time successfully cleans, levels, and feeds heavier materials for today's production requirements. Designed to process strip up to 60" in width and 1/8" in thickness, it works equally well on progressive die or blanking presses without overloading. And, because it is floor-mounted with independent drive it can easily be adapted to future production needs.

If you want to increase the efficiency of your press equipment, why not talk with McKay—pioneer and leading producer of press feed and cut up lines.

FREE BOOKLET

Complete illustrated data on McKay Press Feed and Cut Up Equipment will be mailed without charge at your request. Write for it today.

M°K

THE McKAY MACHINE COMPANY, Youngstown, Ohio

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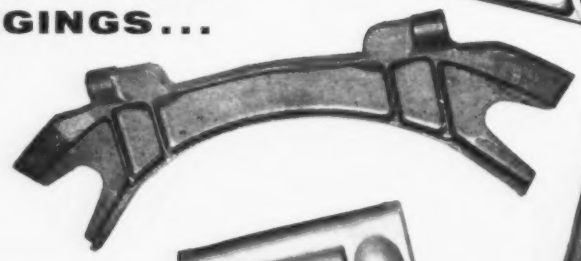
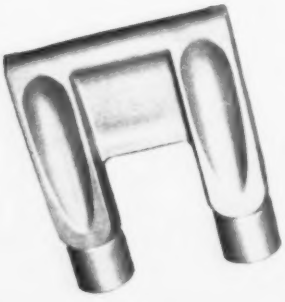
TODAY'S FASTEST EXPANDING FIELDS REQUIRE MORE AND MORE FORGINGS...

FOR INSTANCE—

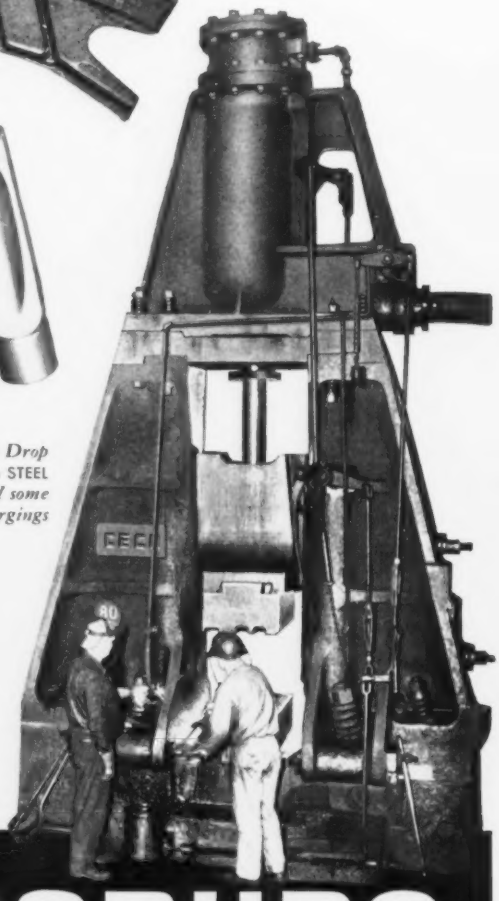


AIRCRAFT



ROAD BUILDING

TRUCKING

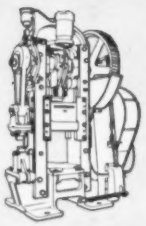


One of the four Chambersburg Steam Drop Hammers at TRANSUE AND WILLIAMS STEEL FORGING CORP., ALLIANCE, OHIO *and some of the* TRANSUE AND WILLIAMS *forgings produced on these hammers.*

CHAMBERSBURG STEAM DROP HAMMERS

BUILT TO HANDLE MODERN FORGING REQUIREMENTS—*WITH HIGHER PRODUCTION—LOWER COSTS*

Cost per piece produced is the only true test of a hammer's worth and the only true basis for appraising its various features. Every feature of the Chambersburg Steam Drop Hammer is designed and built with but one objective—to produce forgings at the lowest cost per piece, whether that cost be on a basis of the piece in its forged or in its machined state. Write for Bulletin No. 55-L-4.



A rugged—low maintenance teammate is the practically indestructible Chambersburg Steel Side Trimming Press.

CHAMBERSBURG ENGINEERING COMPANY · CHAMBERSBURG, PA.

THEY SMASHED INTO THAT WEIRKOTE® TILL WE COULDN'T STAND IT!

When a half-ton steel wrecking ball smashes broadside on target—mister, that's a *test*.

Yet, when Weirkote zinc-coated steel is put through that, or equally brutal punishment, its zinc coating stays skin-tight throughout the ordeal.

Think of that demonstration in terms of *your* products, production steps and cost problems.

Weirkote's continuous-process zinc coating *thrives* on toughest fabrication steps—spinning, deep drawing, roll forming, extrusion. And there's no flaking or peeling.

With Weirkote, you can eliminate the cost of plating, painting or redipping after fabrication. In many instances, you'll get prolonged die life, too, due to the lubricating quality of Weirkote's zinc coating.

Free Weirkote Booklet

Send for the new booklet on Weirkote today. Write Weirton Steel Company, Dept. A-6, Weirton, West Virginia.

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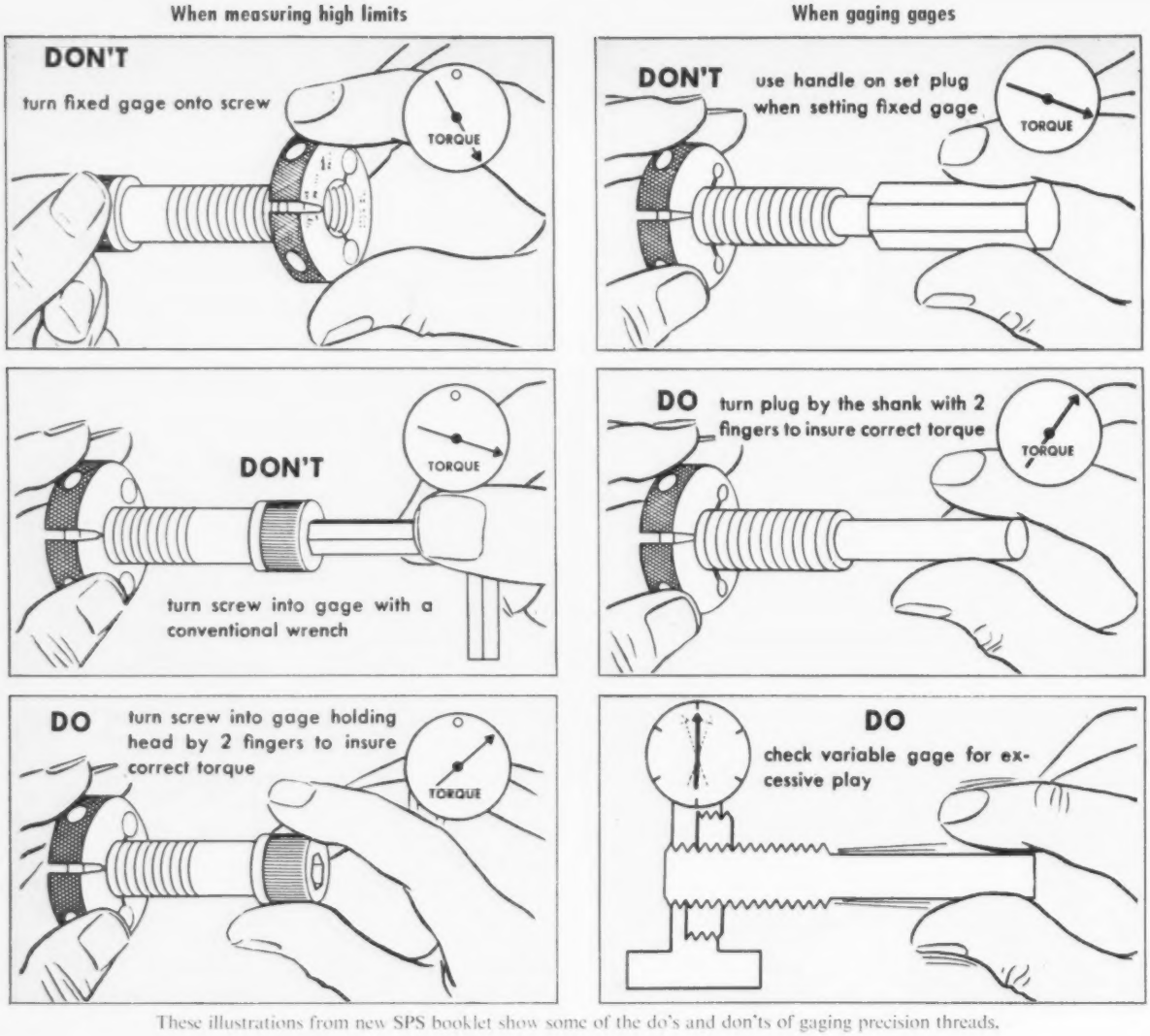

These illustrations from new SPS booklet show some of the do's and don'ts of gaging precision threads.

3A threads: what they are; how to gage them — new SPS booklet tells all

Threads made to Class 3A fit are the most precise in general use in industry. But you do not always get the 3A precision you specify. Because of many different gaging techniques that yield varying results, screws with threads well outside the Class 3A tolerance limits often pass inspection.

SPS has prepared a new booklet on this subject. It explains clearly what Class 3A threads are and the pros and cons involved in the widely varying gaging techniques in use today. It reviews the gaging of high and low limits of 3A threads, sampling techniques, and even the methods of gaging gages.

All standard UNBRAKO socket screw products fall within specified tolerance limits *no matter what method is used to gage them.* Leading industrial distributors carry complete stocks. Unbrako Socket Screw Division, STANDARD PRESSED STEEL Co., Jenkintown 17, Pa.

Form 2239, "Class 3A Threads: what they are; how to gage them." 16 pages, with many illustrations. Write for free copy today.

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UNBRAKO SOCKET SCREW DIVISION SPS

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premium on purity

From the cow to the container, the purity and delicate flavor of dairy products must be protected. Dairy equipment made of stainless steel resists corrosion, imparts no odor to the product and is easy to keep clean and sterile. The highest quality dairy equipment is designed, improved and protected with McLOUTH STAINLESS STEEL.

specify

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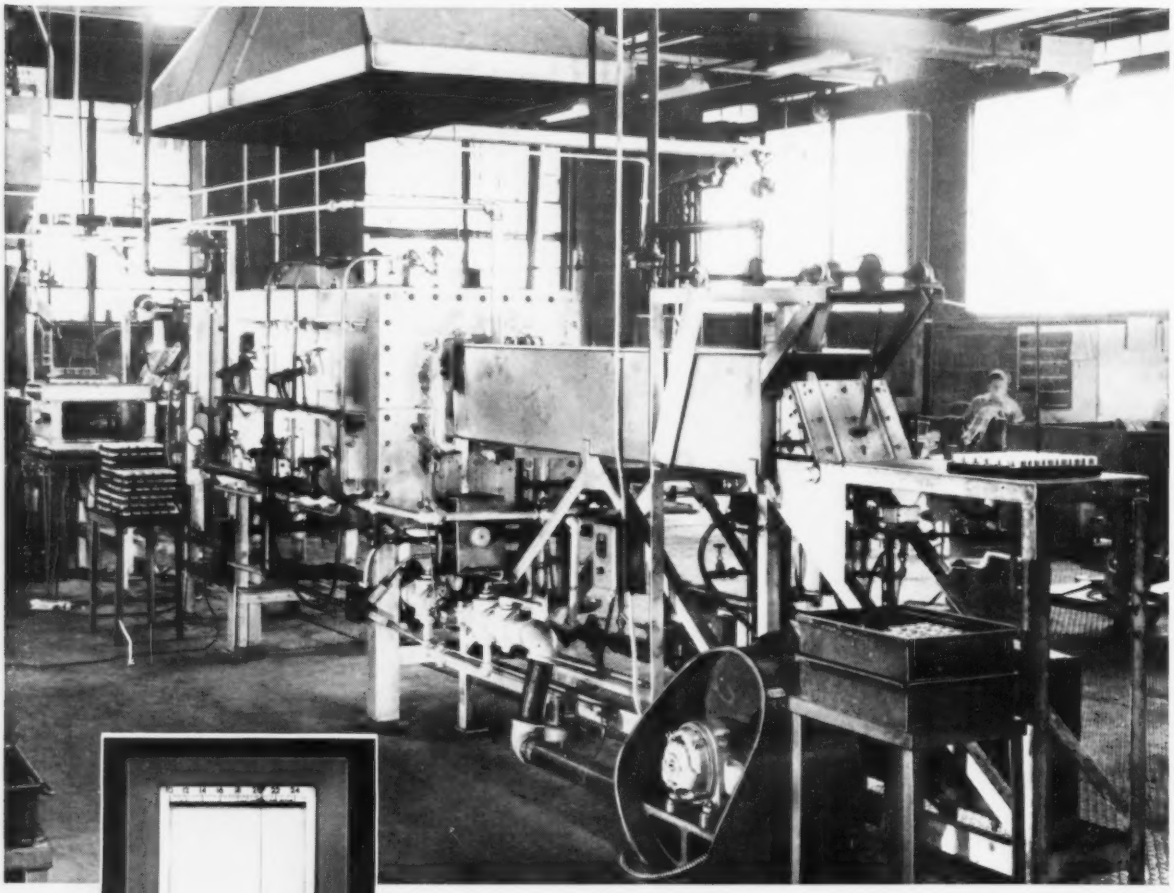
HIGH QUALITY SHEET AND STRIP

for the dairy industry

McLOUTH STEEL CORPORATION DETROIT, MICHIGAN

MANUFACTURERS OF STAINLESS AND CARBON STEELS



Speedomax® H . . . holds critical sintering temperatures in line at Burgess-Norton

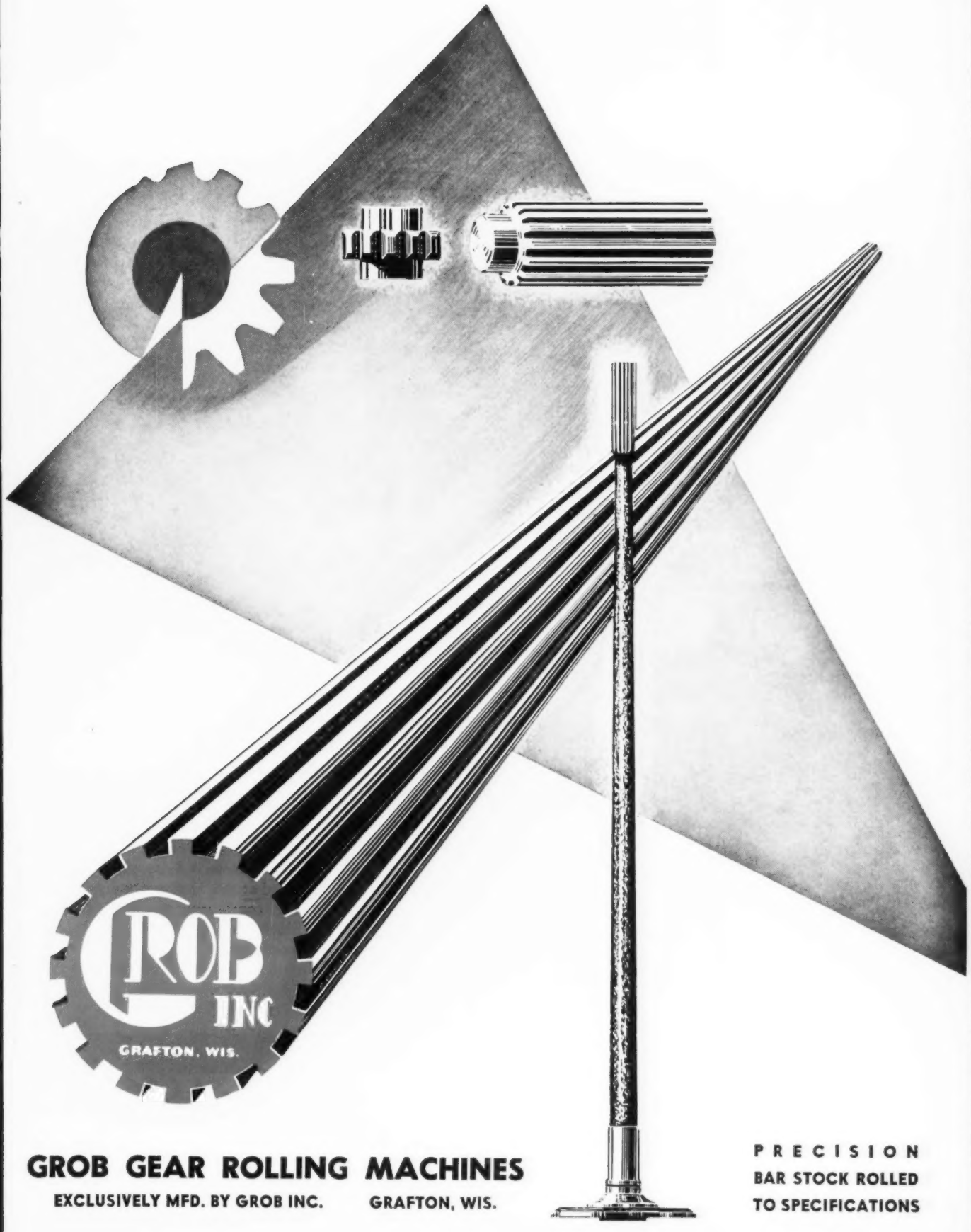
Mix . . . press to a density between 6.2 and 6.6 gms/cc . . . and sinter under good conditions for fifteen minutes at temperature! That's the formula for quality sintered steel parts at Burgess-Norton where many millions of such parts—ranging from small bushings to 4" diameter gears—are turned out a year. Most of these parts are used "as sintered." Some may be further hardened, carburized or plated.

Good sintering conditions include a sintering furnace, like the Surface Combustion furnace shown, and straight-line control of the critical zone as provided by the Speedomax H controller above. An ammonia dissociator, also under L&N temperature control, provides the neutral atmosphere for the sintering furnace.

One of the most important determinations of the sintering process is temperature. If temperature is too high or too low, size and strength will be adversely affected. With Speedomax H 3-Action Position-Adjusting Type control, the sintering temperature is held well within critical limits . . . practically eliminating rejects due to improper sintering.

When installing your next heat treating furnace—whether it's electric or fuel-fired, continuous or batch—it'll pay you to investigate Speedomax H control. A phone call or letter to your nearest L&N office—or to 4956 Stenton Ave., Philadelphia 44, Pa.—will bring more information.

LEEDS NORTHRUP
Instruments Automatic Controls • Furnaces



GROB GEAR ROLLING MACHINES

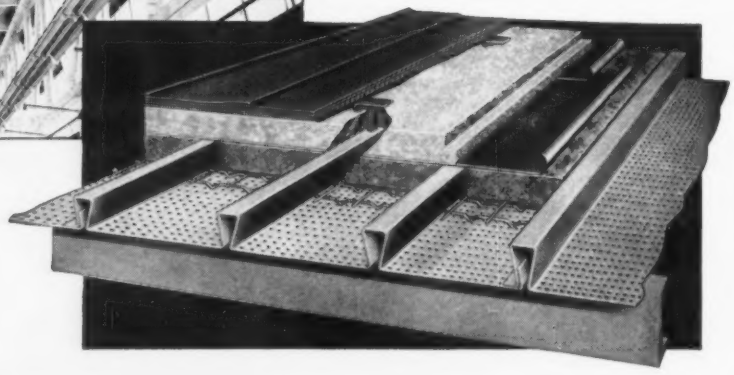
EXCLUSIVELY MFD. BY GROB INC. GRAFTON, WIS.

PRECISION
BAR STOCK ROLLED
TO SPECIFICATIONS

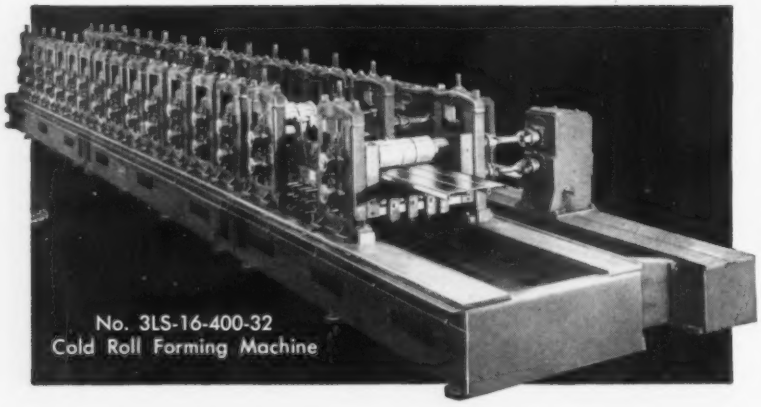
"...satisfactorily produced millions of feet of Holorib roofing", says Mr. N. E. Hubbell

Buffalo Plant Mgr.
Detroit Steel Products Company

"Since 1930 Kane & Roach machinery has satisfactorily produced millions of feet of Holorib roofing — a section which cannot be easily roll formed. When our production increased we called on K & R in 1946 to furnish additional equipment."



Shown above: Installation of Fenestra Acoustical Holorib Ceiling



No. 3LS-16-400-32
Cold Roll Forming Machine

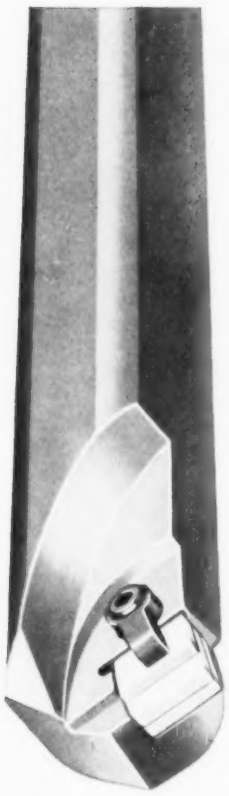
Millions of feet of easily-erected Fenestra roof ribbing have been handled rapidly and accurately on Kane & Roach machines. Nominally rolled from 18 gauge coiled stock the machine forms both plain and perforated sheets. A flying cut off is employed at the discharge end permitting continuous operation of machine in cutting lengths to meet customers' specifications.

Write or wire us today. Our production-tailored engineering can help you cut costs and up production in your plant.

Kane & Roach

INCORPORATED

SYRACUSE, NEW YORK • ESTABLISHED 1887



Square insert, 15-degree lead angle. Suitable for most boring operations.

Triangular insert for turning to a square shoulder handles other boring jobs.

Easily adapted to multiple insert boring heads for many specialized operations.

KENDEX*

BORING BARS

Kendex Boring Bars bring to turret lathe boring operations all the benefits and economies the Kendex principle is bringing to turning, facing and milling operations.

With the proper grade of Kennametal* "throw-away" inserts, bars can be used for both rough and finish boring of pieces up to several inches in diameter. Almost all boring operations can be handled with only two bars. Special designs are available for special jobs.

Ask for a Kennametal Tool Engineer to demonstrate the operation of this important new family of Kendex tools — or write for information. KENNAMETAL INC., Latrobe, Penna.

*Registered Trademark

C-3057

OFFER THESE PRODUCTION BENEFITS

- Suitable for close-tolerance work. Tool can be adjusted while insert remains on center, even when small-diameter bars are used.
- Suitable for heavy stock removal . . . simple design . . . rugged construction . . . hardened alloy steel bar.
- Thinner inserts permit use of harder, more crater-resistant grades with minimized risk of failure due to thermal cracks.
- Cutting point brought down to bar center-line. Standard Kendex chip-breaker plate gives better chip control.

INDUSTRY AND
KENNAMETAL
...Partners in Progress

IMMEDIATE DELIVERY...

ESCO IPS SCREWED FITTINGS

CAST STAINLESS STEEL

150 LB. STANDARD

ESCO cast stainless fittings are a vital part of every corrosion resistant piping system. Cast with heavy wall sections and in a variety of analyses, *ESCO* screwed fittings are carried in warehouse stocks in sizes ranging from ⅛" to 4". Complete size range is available in 90 and 45 degree elbows, tees, crosses, unions, couplings, reducers, plugs, bushings and locknuts. Permanent alloy identification is cast in each fitting to eliminate replacement error.

Special sizes, types and alloys can be made to engineering specifications.

ESCO cast stainless fittings are available from convenient warehouse stocks. See your nearest *ESCO* dealer. He can help you solve your corrosion problems. Ask for *ESCO* Catalog No. 156 giving complete dimensional data.

ESCO

ELECTRIC STEEL FOUNDRY COMPANY

2184 N. W. 25TH AVE. • PORTLAND 10, OREGON

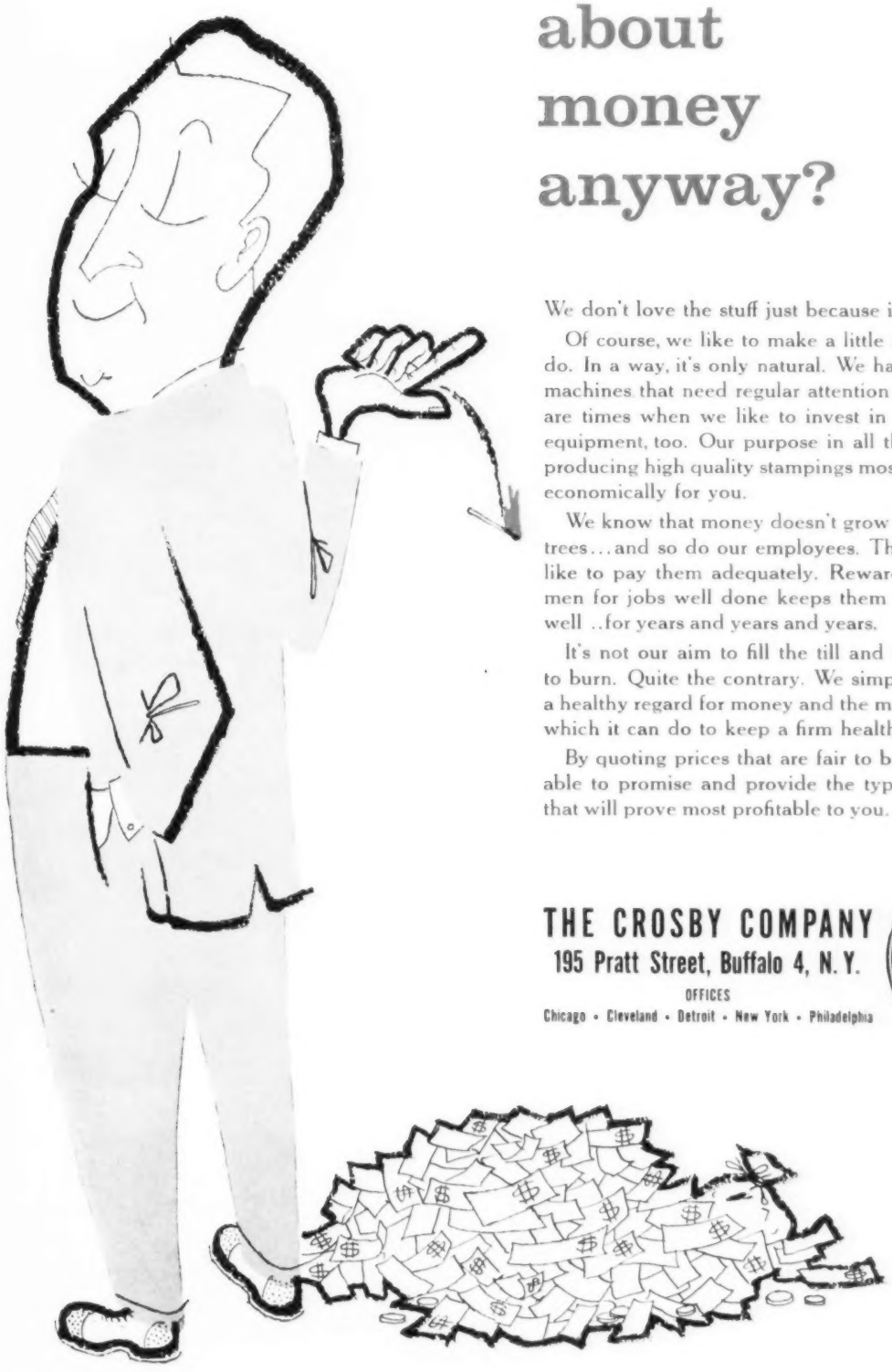
MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.

Offices in Most Principal Cities

ESCO INTERNATIONAL, NEW YORK, N. Y.

IN CANADA ESCO LIMITED

who cares about money anyway?



We don't love the stuff just because it's green.

Of course, we like to make a little on each job we do. In a way, it's only natural. We have machines that need regular attention... and there are times when we like to invest in new equipment, too. Our purpose in all this is to keep on producing high quality stampings most economically for you.

We know that money doesn't grow on trees... and so do our employees. That's why we like to pay them adequately. Rewarding men for jobs well done keeps them doing all jobs well ..for years and years and years.

It's not our aim to fill the till and still have plenty to burn. Quite the contrary. We simply have a healthy regard for money and the many things which it can do to keep a firm healthy

By quoting prices that are fair to both of us, we're able to promise and provide the type of service that will prove most profitable to you.

THE CROSBY COMPANY
195 Pratt Street, Buffalo 4, N. Y.

OFFICES
Chicago • Cleveland • Detroit • New York • Philadelphia

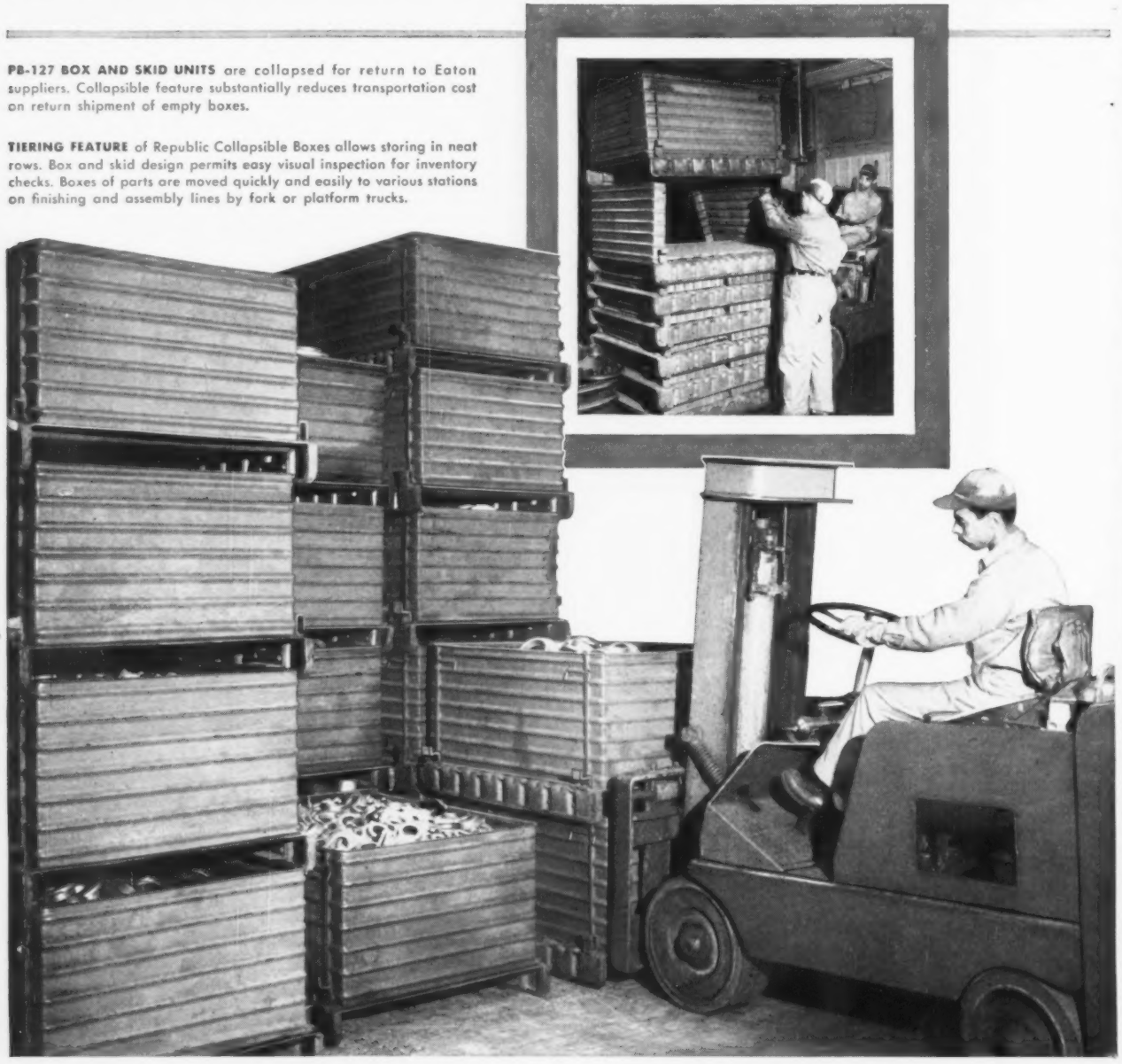
METAL STAMPING SINCE 1896 · THE CROSBY COMPANY · BUFFALO, N.Y.

Eaton handles incoming shipments up to 10

REPUBLIC COLLAPSIBLE

PB-127 BOX AND SKID UNITS are collapsed for return to Eaton suppliers. Collapsible feature substantially reduces transportation cost on return shipment of empty boxes.

TIERING FEATURE of Republic Collapsible Boxes allows storing in neat rows. Box and skid design permits easy visual inspection for inventory checks. Boxes of parts are moved quickly and easily to various stations on finishing and assembly lines by fork or platform trucks.



REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

times as fast with BOXES

Prominent truck axle maker saves 7 to 10 man-hours per load. Reduces storage space requirements as much as 66%.

Eaton Manufacturing Company's Axle Division was faced with a costly and time-consuming problem of unloading and sorting a variety of suppliers' parts shipped in bulk form via truck. Unloading and handling time was running as high as 7 to 10 man-hours per truck.

Eaton Axle Division Industrial Engineers, after reviewing several types of boxes, decided on the use of Republic's exclusive PB-127 Collapsible Box and Skid Units. Accessories were specifically engineered to Eaton's requirements.

Eaton furnishes its suppliers empty boxes in the collapsed position—the collapsible feature substantially reduces transportation costs on the shipment. The supplier sets up the boxes, fills each with a specific size and type of part and returns them to Eaton. The result? Ten trucks can now be unloaded in the time it formerly took to unload one.

But the saving in time, sorting, and transportation is only part of the story. The PB-127 Collapsible Box is a real space-saver. It's designed to save as much as 66% of the space used by a non-collapsible box. It can be tiered when loaded or empty—collapsed or set up. The PB-127 is built for heavy-duty service. It is a one-piece unit. All parts are permanently attached. A pin and slide bolt arrangement assures positive locking in the set-up position.

Republic Collapsible Steel Boxes are made in a wide range of widths, lengths and heights to meet your requirements. Or if you have a special handling problem, Republic engineers will help you design a unit to fit your plant operation. The coupon will bring you more facts by return mail.

STEEL

and Steel Products

FAST ON-SITE ERECTION with Truscon's new "Budget Buildings". Simplified design brings the cost down low. It's a quality steel building with a tight, dense, galvanized coating that's more rust-resistant than ever. No painting needed. Your "Budget Building" order will be filled fast from off-the-shelf stocks. Immediate delivery in widths of 32, 36, 40, 44 and 48 feet... 12- and 14-foot heights... lengths as long as you want them. Send coupon for details.

SIMPLIFY HANDLING, STACKING AND PALLETIZING of bulky, uneven, odd-lot and fragile materials with Republic Steel Pallets and adjustable Pallet Racks. Tubular steel supports on racks adjust every six inches to handle palletized material of any height. Two-way entry permits loading and unloading from either side. Select single pallets from any level without restacking. Mail coupon for specifications and quotations.

REPUBLIC STEEL CORPORATION
DEPT. C-4230
3104 EAST 45th STREET • CLEVELAND 27, OHIO

☐ Send more information on Republic Collapsible Boxes.
☐ Have a Materials Handling Engineer call.
Send me more facts on:
☐ Truscon "Budget Buildings" ☐ Pallet Racks

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

SPECIALIZED RESEARCH

This expansion test illustrates why the special composition developed for Kaiser Periclase Chrome brick assures better end wall service.

To show the effect of steel plates on permanent growth, two types of pre-fired brick with steel plates on four sides were laid up to form the side-walls of a test furnace. This furnace was heated with gas to 3100°F., ± 25°, and held there for 16 hours.

After cooling, the bricks were measured for comparative permanent growth. The effects shown were solely of the heating and iron oxide reaction. The chrome-magnesite type (upper row) showed an average 9% permanent linear growth; Kaiser Periclase Chrome (lower row) grew an average of only 1.4%.

This test demonstrates one of the many ways that Kaiser Chemicals research continuously proves—and improves—specialized products for better service to the steel industry.

PRODUCT SPECIFICATION

Compare these specifications to those of any other end wall brick . . . and the comparison will tell you why more and more open hearth operators specify Kaiser Periclase Chrome Brick—long respected for its consistent high quality and consistent high performance values:

1. Greatly increases end wall life when needed, or 2. Cuts costs with thinner walls when end wall service is balanced.

1. CHEMICAL ANALYSIS: (Typical)

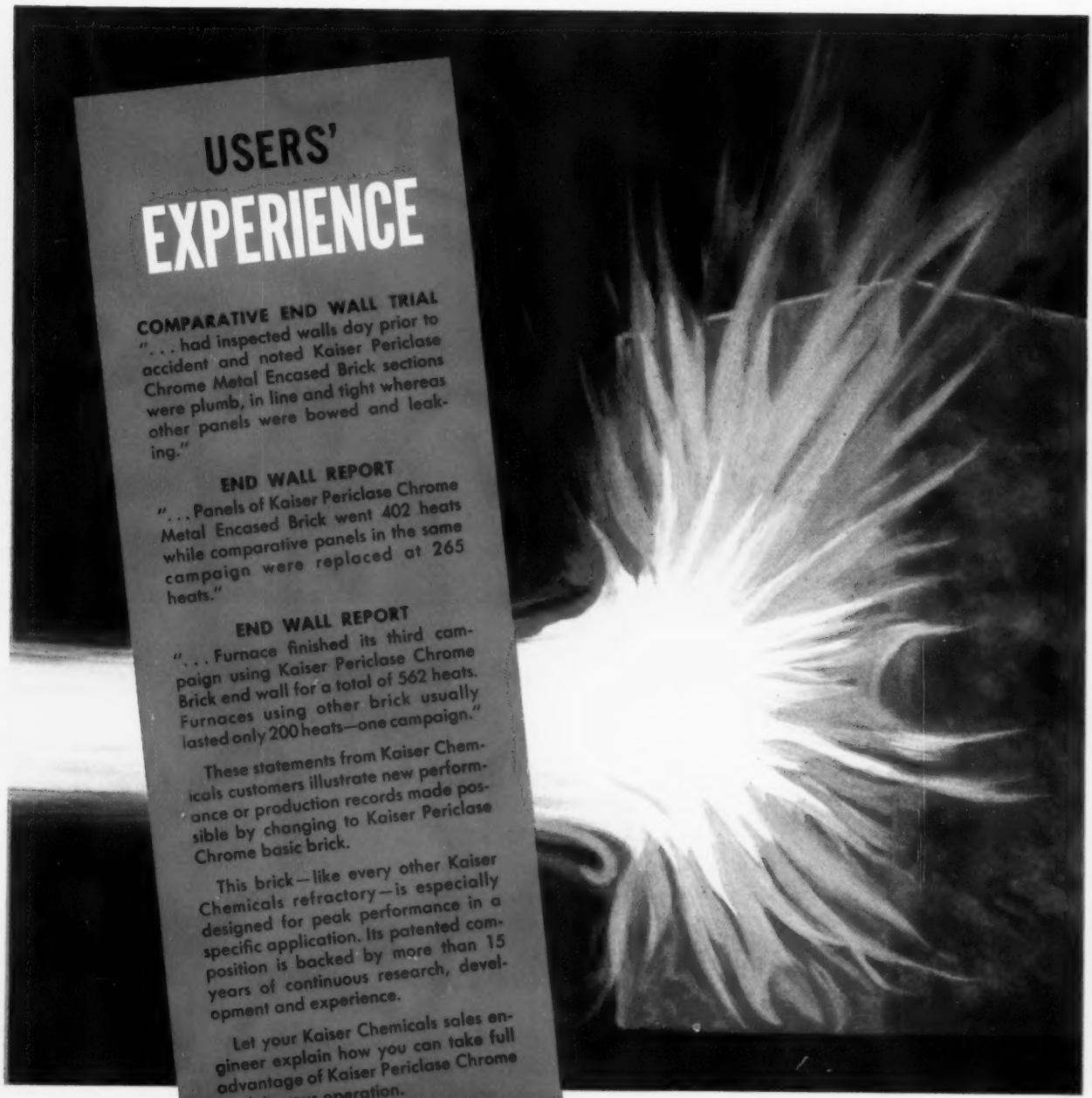
	Chemically Bonded	Burned
Loss on Ignition	3.7%	0.0%
CaO	1.0	1.0
SiO_2	8.4	8.7
Cr_2O_3	9.1	9.4
Fe_2O_3	4.5	4.7
Al_2O_3	7.9	8.2
MgO (by difference)	65.4	68.0
	100.0	100.0

2. PHYSICAL PROPERTIES: (Typical)

REFRACTORINESS: Hot Load Test (sheer Temp. @ 25 lbs./sq. in.)	3090°F	3090°F
Deformation, @ 25 lbs./sq.-in., ½ hr. @ 3000°F	**	3–5%
P.C.E. Value	over 42	over 42
VOLUME STABILITY: Shrinkage (no load) Linear, % (after firing to 3000°F 5 hrs.)	**	0%
Linear Coefficient of Reversible Expansion (in./in./°F) (80-2730°F)	*	6.25×10^{-6}
Reversible Thermal Expansion @ 2730°F	**	1.7%
POROSITY: Apparent	—	20.5%
True	7.5%	21.5%
DENSITY: Bulk, lbs./cu. ft.	187	179
Av. Wt. of 9" x 4½" x 3" Straight, lbs.	12.9	12.6
STRENGTH: Crushing strength, lbs./sq. in.	9,000	5,000
MEAN SPECIFIC HEAT: (85-1830°F) (Btu/lb./°F)	**	0.264

*Figure not constant over temperature range.
**No value applicable. Brick is burned in test.

All three show why you get superior with Kaiser Periclase Chrome



USERS' EXPERIENCE

COMPARATIVE END WALL TRIAL
"... had inspected walls day prior to accident and noted Kaiser Periclase Chrome Metal Encased Brick sections were plumb, in line and tight whereas other panels were bowed and leaking."

END WALL REPORT
"... Panels of Kaiser Periclase Chrome Metal Encased Brick went 402 heats while comparative panels in the same campaign were replaced at 265 heats."

END WALL REPORT
"... Furnace finished its third campaign using Kaiser Periclase Chrome Brick end wall for a total of 562 heats. Furnaces using other brick usually lasted only 200 heats—one campaign."

These statements from Kaiser Chemicals customers illustrate new performance or production records made possible by changing to Kaiser Periclase Chrome basic brick.

This brick—like every other Kaiser Chemicals refractory—is especially designed for peak performance in a specific application. Its patented composition is backed by more than 15 years of continuous research, development and experience.

Let your Kaiser Chemicals sales engineer explain how you can take full advantage of Kaiser Periclase Chrome Brick in your operation.

end wall service Basic Brick

Call or write Kaiser Chemicals Division, Dept. S7251, Kaiser Aluminum & Chemical Sales, Inc., at any of the regional offices listed below:

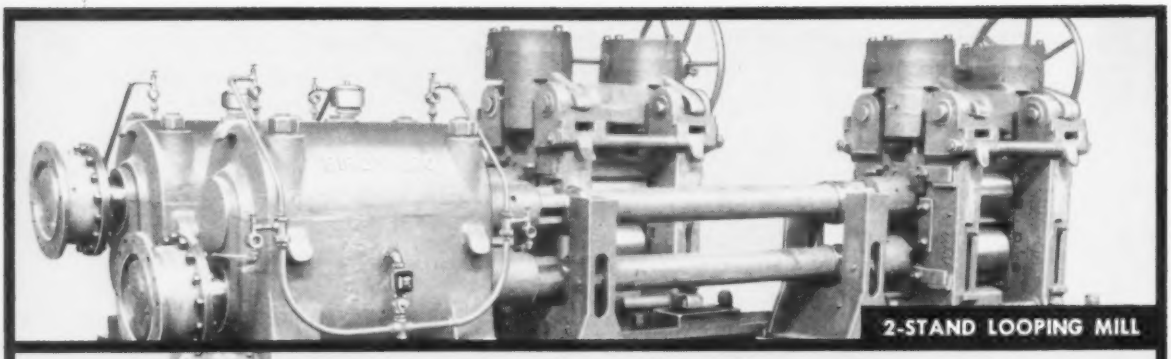
PITTSBURGH 22, PA. . . . 3 Gateway Center
HAMMOND, IND. . . . 518 Calumet Building
OAKLAND 12, CALIF. . . . 1924 Broadway

CHEMICALS KAISER REFRACTORIES

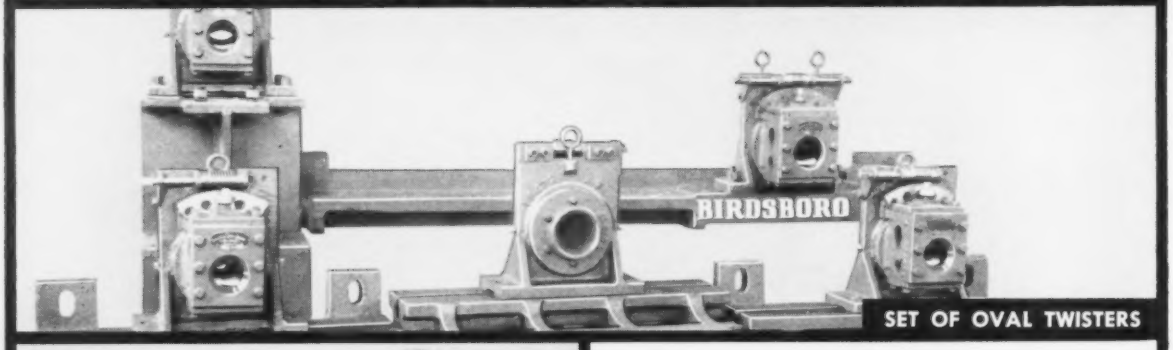
Kaiser Chemicals

Pioneers in Modern Basic Refractories

REFRACTORY BRICK & RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE • ALUMINAS

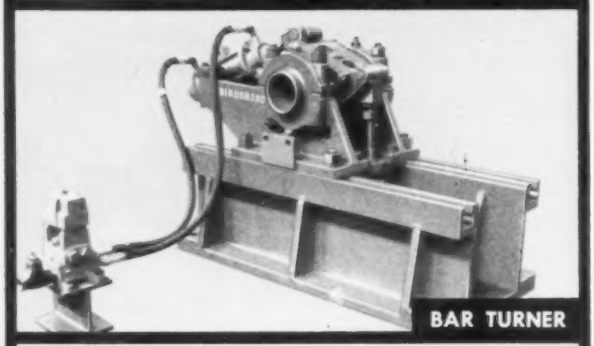


2-STAND LOOPING MILL

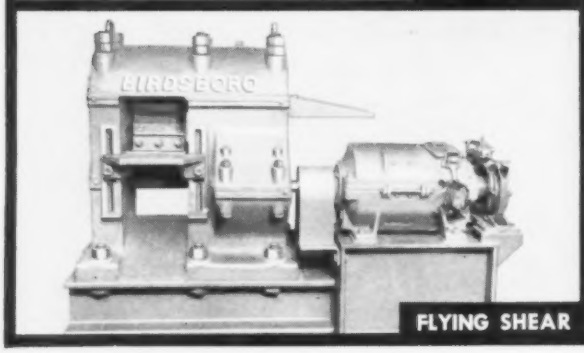


SET OF OVAL TWISTERS

REDUCTION GEAR DRIVE



BAR TURNER



FLYING SHEAR

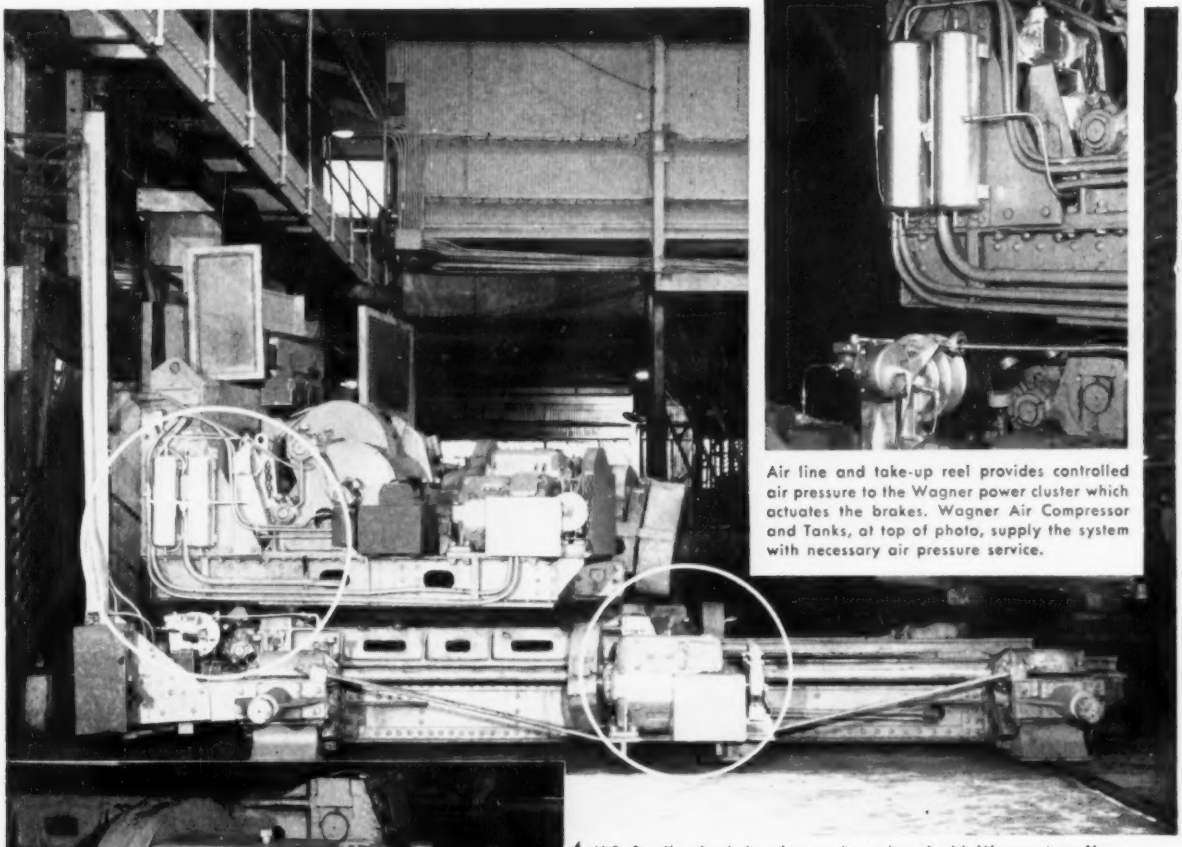
BIRDSBORO face-lifts rod mill with new additions to increase production quotas

This equipment was supplied by Birdsboro to revamp and modernize a specialty rod mill. By custom-designing special equipment, Birdsboro was able to help the client make important advances in productivity. There is almost no limit to the design versatility of the Birdsboro staff, even for the intricate requirements of a re-building program. From a single time and labor-saving unit to an entire mill, Birdsboro has more to offer your operation . . . call in a Birdsboro representative and find out why. Main office and plant: Birdsboro, Pa.

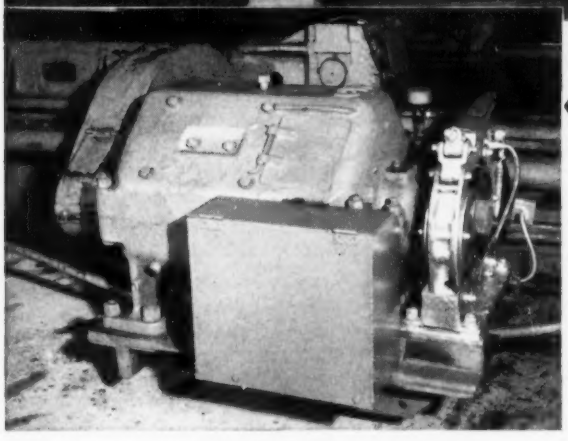
District Office: Pittsburgh, Pa., Subsidiary: Engineering Supervision Co., 120 W. 42nd St., New York 36, N. Y.

BIRDSBORO
STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES (Metalworking and Extrusion) • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel



Air line and take-up reel provides controlled air pressure to the Wagner power cluster which actuates the brakes. Wagner Air Compressor and Tanks, at top of photo, supply the system with necessary air pressure service.



U.S. Steel's wheel charging car is equipped with Wagner type H Hydraulic Crane-Bridge Brakes, as shown at left.

Wagner power brake system controls movement of wheel charging machine for U. S. Steel

This 21-ton wheel charging car at U. S. Steel Corporation, Gary, Indiana plant works at high speed to feed an automation line. It takes red hot railroad car wheels from a forging press—carefully places them in a re-heating furnace—moves them to the automated line for shaping, trueing and marking.

A Wagner Air-over-Hydraulic Industrial Power Braking System, especially designed for this application, keeps this machine under complete control. The operators can make safe, sure, precise stops with ease.

Wagner can now offer such Power Brake Systems to meet *your* requirements. Call your nearby Wagner Field Engineer—let him help you make safe, sure stops with your speeded-up charging machines.

157-1

Wagner Electric Corporation
SERVING INDUSTRY SINCE 1891

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

Wagner Electric Corporation
6103 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

metalworking
More melt per man-hour for the nation's foundries with efficient WHITING FOUNDRY EQUIPMENT
More than 90% of the nation's cast iron is melted in Whiting Cupolas. Higher quality melt is obtained with Whiting Electric Furnaces, Hot Blast and Charging Equipment. Tumbling mills, air furnaces, annealing ovens, transfer cars, pulverizers, turntables and cupola spark suppressors manufactured by Whiting also contribute to efficient foundry operations.
Whiting Ladles
There is a great variety of Whiting ladles to meet all requirements in foundry operation.
9

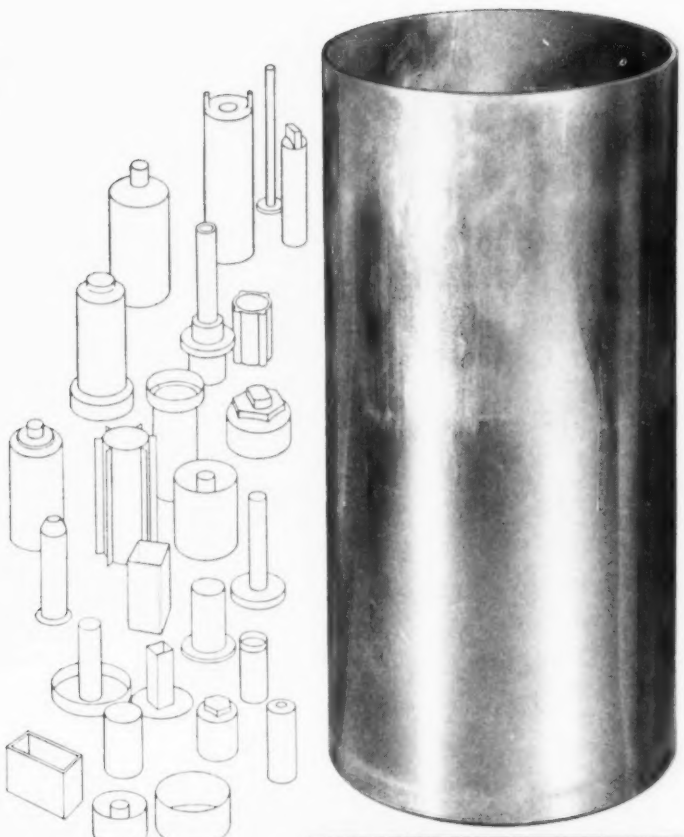
Looking for new ways to cut costs?

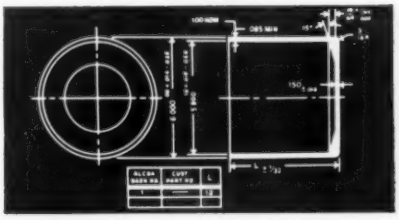
Send for this booklet! See how Whiting Foundry equipment — electric furnaces, cupolas, ladles and many other cost-cutting products can provide new efficiency for your operations. Read "Working for Profit in Every Industry", the new, pocket-size booklet which explains why the majority of America's leading corporations specify Whiting products. There's other helpful information here, too . . . on Whiting Cranes . . . on Trambeam Overhead Systems . . . in fact on every Whiting product used in your type of industry. Write today for a copy of "Working for Profit", *Whiting Corporation, 15601 Lathrop Avenue, Harvey, Illinois.*

WHITING

FOUNDRY EQUIPMENT

MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; METALWORKING AND CHEMICAL PROCESSING EQUIPMENT





this **ALCOA IMPACT** solved a designer's problem

This large container represents the basic form of impact extrusion. Fabricated in one stroke of the press (as are all impacts), this part looks simple but would present problems if made by any other process. It is noteworthy on at least two counts to designers fighting to reduce material and fabricating costs:

First: it is a chest thumper for the designer who conceived it, because it reduces the cost of the part to one-fourth of the original estimate for other materials and conventional methods of fabrication. Its strong, seamless, easy-to-clean construction fits exactly the requirements for service as a sugar dispenser in an automatic coffee vending machine. *Second:* it is the largest diameter impact we are currently producing and gives you some idea of how big an impact can be. Large or small, simple or intricate, all impacts are completely fabricated in a fraction of a second with just one stroke of the press.

Sound too easy? Well, this is only the beginning. Using exactly the same techniques we can punch round, oval, square or special shapes. We can incorporate ribs, splines, flutes or other functional or decorative longitudinal patterns, on the inside or outside. In fact, just about any closed end tubular part or cup-shaped part should be considered as an Alcoa® Impact. We don't know what we'll be working on next. We'd prefer to be limited only by your imagination.

To get your thinking started, send for Alcoa's design manual, *Alcoa Impacts—Metal in Motion.* For immediate help with any problems, call your Alcoa sales engineer. You'll find the nearest Alcoa sales office listed under "Aluminum" in the Yellow Pages of your phone book. Aluminum Company of America, 1997-G Alcoa Building, Pittsburgh 19, Pa.

Some Impact Rules of Thumb—
Check your problems against this list:

1. Parts requiring hollow sections—either tube or cup-shaped with one end closed.
2. Parts with walls or surfaces requiring zero draft.
3. Parts requiring lengths up to eight or ten times the diameter.
4. Parts requiring the strength of forgings.
5. Parts requiring tolerances down to ±0.005".
6. Parts requiring ribs, bosses or fins as integral parts.
7. Parts requiring low unit cost in mass production. (Often the savings in machining, fabrication and assembly made by impacts amortize tooling in relatively short runs.)

ALCOA ALUMINUM IMPACTS

YOUR GUIDE TO THE BEST IN ALUMINUM VALUE

THE ALCOA HOUR

Now...load rate your bearings at higher values

with Tru-Rol CROWNED ROLLERS

Greater capacity . . . longer life . . . or a precisely balanced gain of *both* factors. That is the choice offered you by the "crowned" rollers of Tru-Rol bearings.

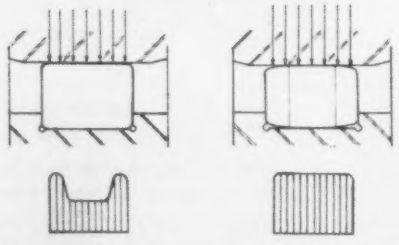
By finish grinding a carefully selected crown radius on roller ends, Rollway relieves high stress areas, insures uniform distribution of load over the entire length of the roller. Rollers can take heavier loads without excessive end-fatigue, and are less subject to the effect of slight misalignment or deflection.

The result is load rating at higher values for greater capacity, longer service life . . . or both. If this choice interests you, why not write for the complete story. Rollway Bearing Co., Inc., Syracuse, N. Y.

Tru-Rol Bearings with crowned rollers are available in 3 types

Stamped Steel Retainer with Guide Lips | Segmented Steel Retainer | Full Roller

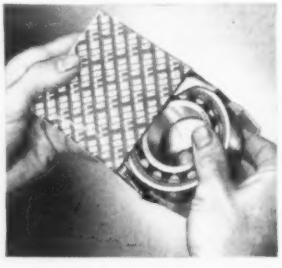
Comparative Stress Patterns under Uniform Loads for Straight and Crowned Cylindrical Rollers



Stress pattern for a straight cylindrical roller under load. Note uneven end-loading.

Stress pattern for crowned roller under load. Crowning radius is exaggerated for clarity.

● Rollway engineering service is available to help you select exactly the right bearings for your needs. Write us.



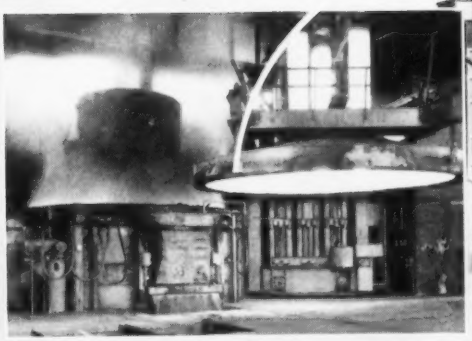
ROLLWAY BEARINGS

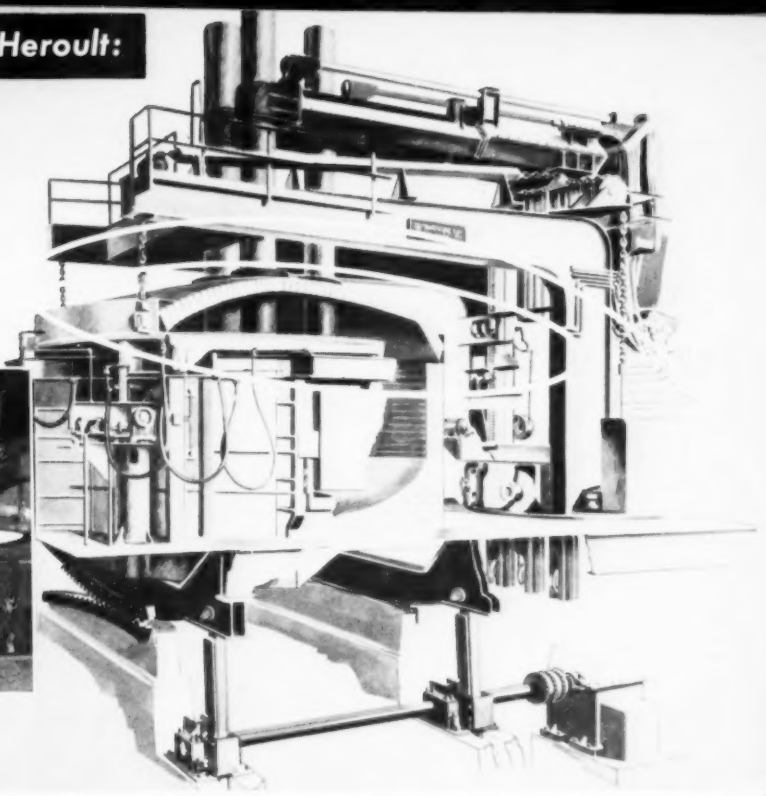
COMPLETE LINE OF RADIAL AND THRUST CYLINDRICAL ROLLER BEARINGS

ROLLWAY REPLACEMENT BEARINGS are available through authorized distributors in principal cities. Consult the yellow pages of your telephone directory — under "Bearings".

ENGINEERING OFFICES: Syracuse • Boston • Chicago • Detroit • Toronto • Pittsburgh • Cleveland • Milwaukee • Seattle • Houston • Philadelphia • Los Angeles • San Francisco

Exclusive with the Heroult:





Water-cooled Skew Back Roof Ring

One of the features of the new Heroult is its low-cost maintenance. It is designed to make bricking easy and economical. Even the repair of the removable roof can be accomplished in much less time and with less labor and material cost. For the Heroult is the only electric furnace on the market with a water-cooled, skew-back type of roof ring. This patented design feature eliminates the need of special skew-shaped brick.

Embodying the latest in mechanical and electrical equipment, these widely used furnaces are noted for efficient performance and low operating and maintenance costs.

They are available in size of shell diameter ranging from 7′0″ up to 24′6″, and with rated charge capacity of from 8000 lbs. up to 400,000 lbs. They are equipped with removable roofs to permit top charging. Both gantry and swing-type roof-removing mechanisms are available. Door-charging furnaces and furnaces of special design, including units equipped with non-magnetic steel bottoms to permit induction stirring, can be supplied.

We welcome an opportunity to help you select and install the Heroult best suited to your needs.

The Heroult is the only 100% mechanically operated electric furnace

All of the movements of the Heroult are handled by motor-driven gear mechanism. This is a very important advantage, for it eliminates many maintenance difficulties. Your own maintenance man can easily keep this modern electric furnace performing efficiently with a minimum of service.

This and other Heroult exclusives, such as cage-type shell construction, independently supported operating mechanism, and water-cooled skew-back roof ring, make the Heroult the finest electric melting furnace on the market.

Ask for latest catalogue

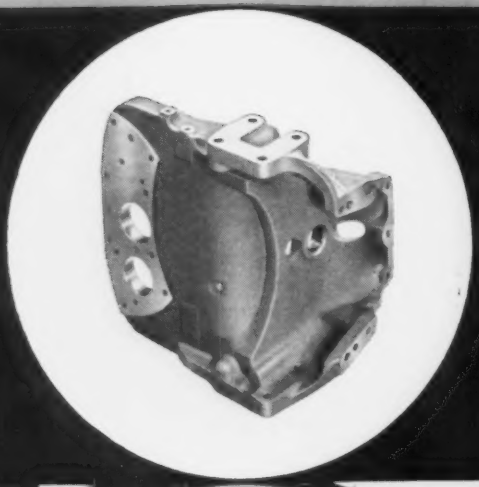
This free catalogue will help you determine how Heroult Electric Furnaces can improve your operation . . . and enable you to make better quality steels. Tells you where and when an electric furnace is desirable. Gives furnace types, sizes, capacities and ratings. For your free copy, just contact the office nearest you, or write direct to Pittsburgh.

Heroult
ELECTRIC
MELTING FURNACES

AMERICAN BRIDGE DIVISION
UNITED STATES STEEL CORPORATION, GENERAL OFFICES:
525 WILLIAM PENN PLACE, PITTSBURGH, PA.
Contracting Offices in New York, Philadelphia, Chicago, San Francisco and other principal cities
United States Steel Export Company, New York

USS

UNITED STATES STEEL



At Massey-Harris-Ferguson

Natcos Save 100 Parts...

Three multiple-spindle Natcos bore, drill, spotface and tap the front end support for a Massey-Harris-Ferguson tractor

NATCO

60 Man Hours Every

on Rugged Axle Support Castings

Massey-Harris-Ferguson checked it two ways. Nine general-purpose machines would do the job—or 3 Natcos. They chose the Natcos for these reasons:

- *Saving of $30,000 in machine cost*
- *Saving of 60 man hours every 100 parts*
- *Saving of 65% in floor space*

The Natcos handle all drilling, boring, spotfacing and tapping—a total of 67 operations on the 182-pound front axle casting. The casting is heavy, irregular—tough to fixture and clamp. The Natcos meet production requirement of 11 parts per hour.

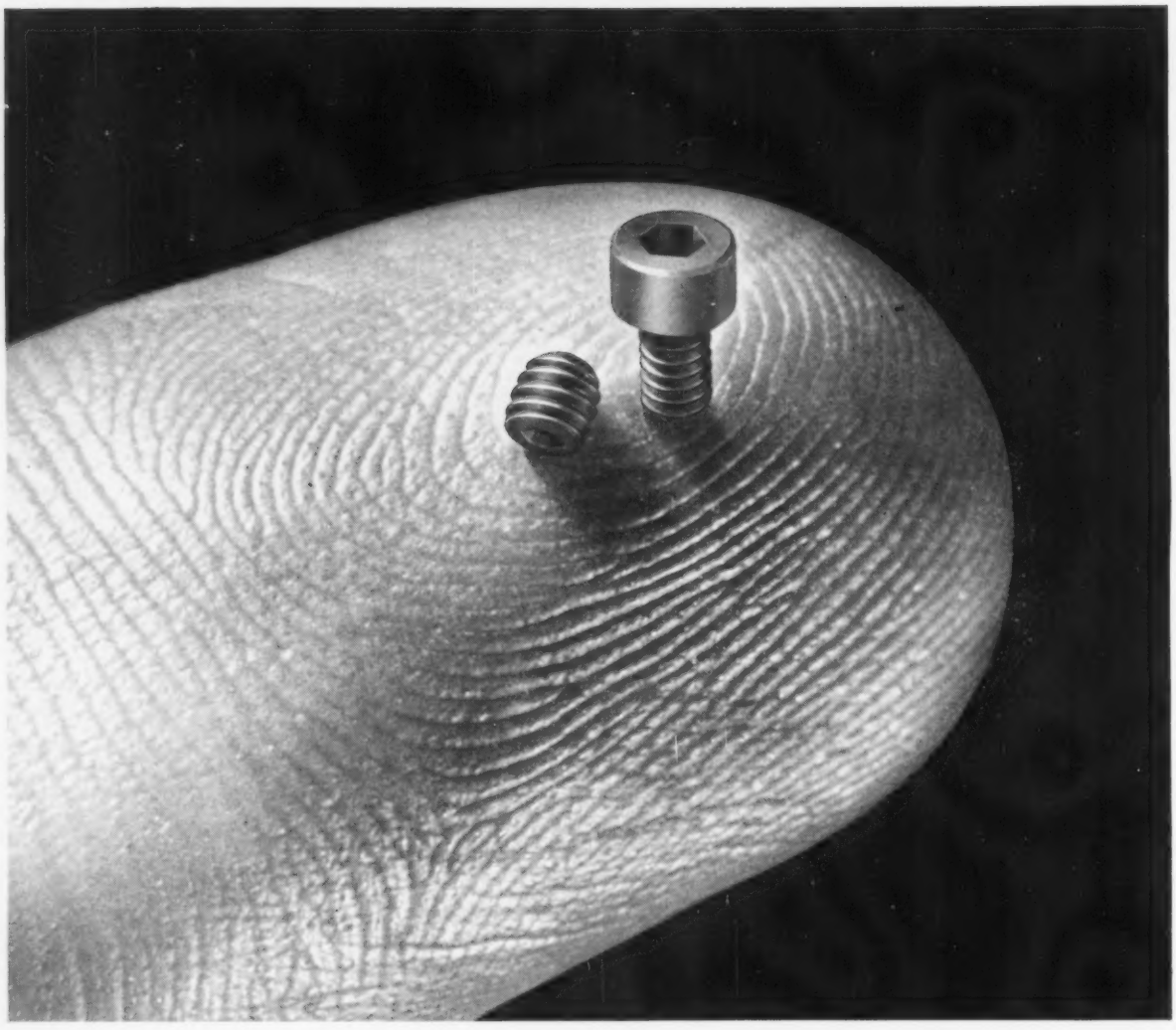
Natco provided complete tooling which features automatic clamping, cycling and chip blow-out. All three machines are of unitized construction, giving Massey-Harris-Ferguson the flexibility to run different parts of redesigns of the same part.

Let Natco Field Engineers point out cost-saving and time-saving methods on your next drilling, boring, facing or tapping job. Natco offices are located in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland and Los Angeles; distributors in other cities.

National Automatic Tool Company, Inc.

Richmond, Indiana

Multiple-spindle drilling, boring, facing and tapping machines. Special way-type, index and transfer machines.



Cleveland miniature socket screws give extra strength in compact assemblies

Cleveland miniature cap and set screws eliminate the need for designing special screws to fasten parts in compact units. In countless intricate devices – servomechanisms, computers, typewriters, electronic and electrical equipment–they are used as functional parts permitting significant reduction in size, weight and cost without sacrificing strength.

Dimensions are held to very close tolerances. Accurately formed hexagon sockets insure high torque, nonslip wrenching, and maximum wrench holding power. Threads are rolled for accurate Class 3 fit and to gain extra fatigue and tensile strength. Alloy steel screws are carefully heat treated to obtain optimum of 180,000 psi minimum tensile strength.

Cleveland standard miniature screws are available from stock in both high quality heat treated alloy steel and nonmagnetic 18-8 stainless. Write today for prices and a copy of the Cleveland socket screw products folder.

RECOMMENDED INSTALLATION TORQUES IN IN.-LB. FOR HEAT TREATED ALLOY STEEL SOCKET SCREWS

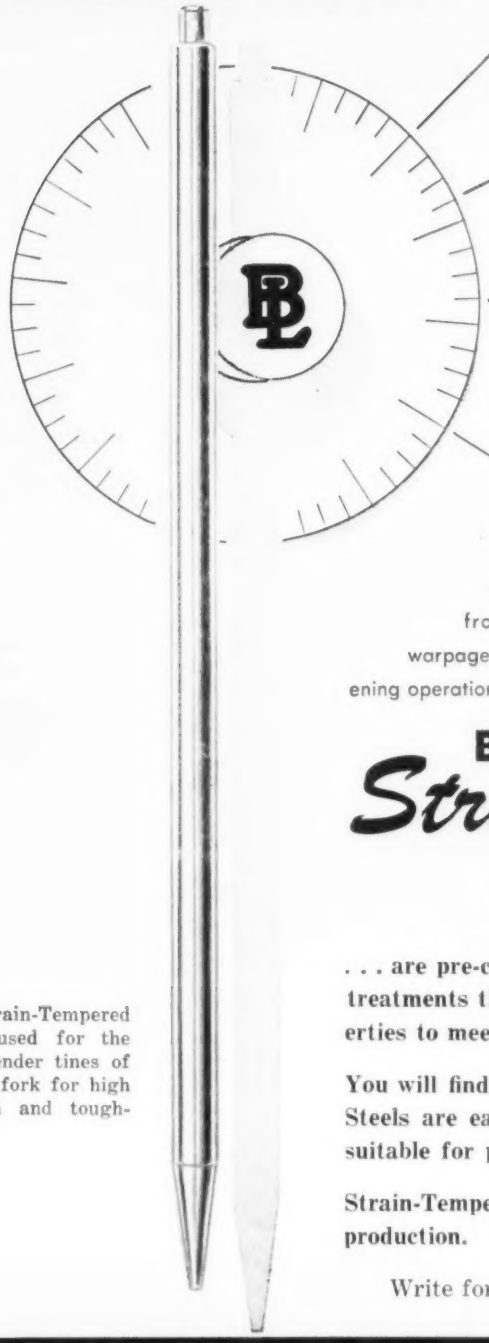
Socket head cap screws			Socket set screws, plain cup point		
Diameter	NC	NF	Diameter	NC	NF
#0	—	2.0	#0	0.5	0.5
#1	3.5	3.5	#1	1.5	1.5
#2	6.0	6.0	#2	1.5	1.5
#3	8.5	9.5	#3	5.0	5.0

THE CLEVELAND CAP SCREW COMPANY

4444-1 Lee Road, Cleveland 28, Ohio

WAREHOUSES: Chicago • Philadelphia • New York • Los Angeles

The RIGHT combination....



HIGH PHYSICAL PROPERTIES

Strain-Tempered Steels provide the right combination . . . "tailored" to your order.

GOOD MACHINABILITY

Strain-Tempered Bars give better machining qualities than normally obtained from steels of similar strength and physical properties.

SUITABLE DUCTILITY

Strain-Tempered Steel offers you a good balance of ductility in combination with high strength, toughness or other desired physicals.

MINIMUM DISTORTION

Strain-Tempered Bars . . . controlled in processing to develop maximum freedom from cold-working strain . . . show minimum warpage in machining, and save you costly straightening operations.

B&L Strain-Tempered Steels used for the long slender tines of loading fork for high strength and toughness.

BLISS & LAUGHLIN *Strain*-TEMPERED* BAR STEELS

. . . are pre-conditioned for the job by closely controlled furnace treatments that provide the *right combination* of physical properties to meet your requirements.

You will find that these "tailored-to-order" Strain-Tempered Bar Steels are easier to fabricate . . . eliminate heat treating . . . suitable for precision parts and high strength applications.

Strain-Tempered Steels are the right combination for economical production.

Write for Bulletin No. 55 on Strain-Tempered Bar Steels

* Trade-Mark Reg.

BLISS & LAUGHLIN, INC.

GENERAL OFFICES: HARVEY, ILLINOIS

SALES OFFICES IN ALL PRINCIPAL CITIES

FOUR PLANTS:—

HARVEY, ILL.

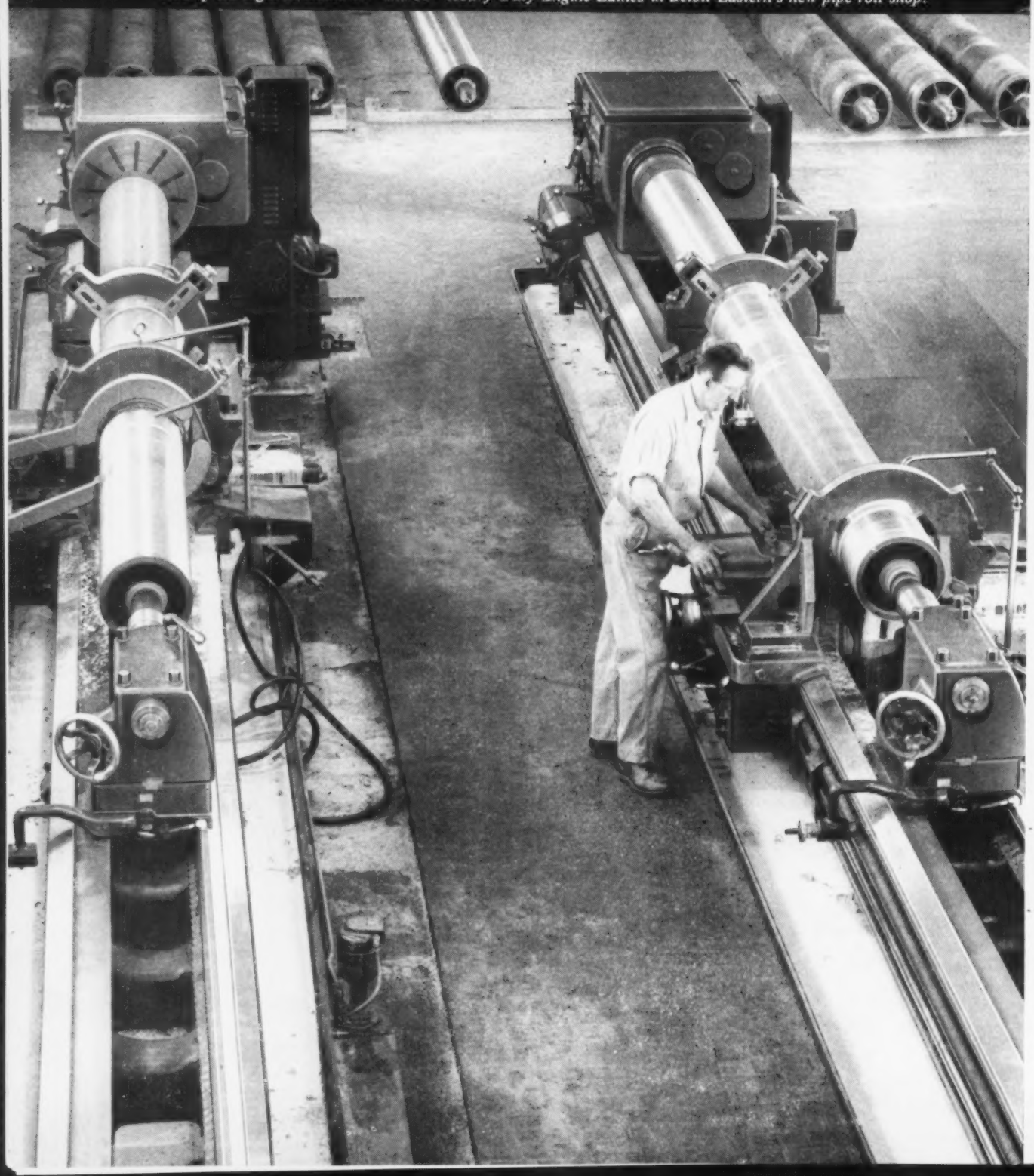
DETROIT, MICH.

BUFFALO, N. Y.

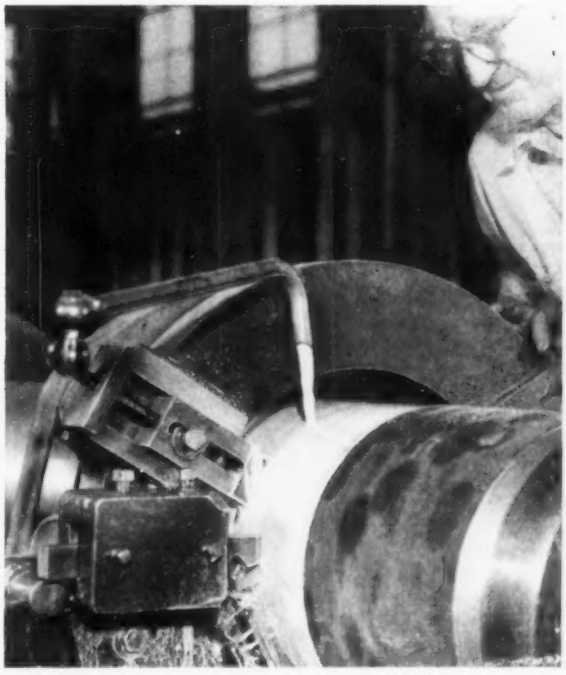
MANSFIELD, MASS.

Beloit Eastern needed LeBlond

Two of the eight LeBlond 25" and 32" Heavy Duty Engine Lathes in Beloit Eastern's new pipe roll shop.



rigidity for this 3 in 1 turning idea



Finishing tool is mounted on back of special follow rest.

LeBlond lathe owners often tell us about unusual ways they are able to use our machines. There's a reason. The rigidity, accuracy, weight—the unique features of LeBlond lathes encourage owners to expect a little more of them. With LeBlonds they confidently develop turning techniques that they just couldn't expect an ordinary lathe to handle.

Take this pipe roll "skinning" job at Beloit Eastern Corporation, Downingtown, Pa. These 23′ extruded wrought steel pipe rolls must mate perfectly in high-speed paper making machinery. This calls for straight and true machining accurate to .002 end to end—in itself, a stringent test of lathe rigidity.

But Beloit Eastern had to "skin" costs, too. So they took advantage of LeBlond's unique tailstock design with their unusual 3 in 1 turning idea. Now rolls are roughed, finished and polished all in *one* operation:

1. **ROUGHING**—Carbide tool is mounted on the compound.
2. **FINISHING**—A special solid ring-type follow rest (bolted to the carriage wings) carries a tool block and high-speed finishing tool.
3. **POLISHING**—A wooden emery paper holder made like a clamp is tied together against the turning pressure of the roll.

Spindle rigidity of the LeBlond tailstock, when greatly extended, actually makes this cost-saving method possible, since room must be made for follow rest at beginning of cut. The tailstock spindle even when extended, has full-length support thanks to exclusive LeBlond Thrust Lock design.

Ask any LeBlond lathe owner. He'll tell you he likes LeBlonds because he can count on them—for more rigidity, more usable power, more years of dependable, accurate turning. After all, isn't that what *you* want in a lathe? Today, get all the details on the complete LeBlond line of heavy duty turning machines, the most dependable lathes in the world. Call your LeBlond Distributor or write. *Ask for Bulletins HD-156 (25″) and HD-165 (32″).*

. . . cut with confidence

THE R. K. LEBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

LeBLOND of Cincinnati

World's Largest Builders of a Complete Line of Lathes for More Than 70 Years

Vinson Steel and Aluminum Co.
Dallas, Texas says:

Shearing capacity of this machine is 12'-0" x ½" mild steel. Note accessibility of two cranks on right end housing. Upper crank is for knife adjustment. Lower one is for back gauge adjustment.

Adjustable Blade Clearance Allows Use of Shear for Complete Range of Thicknesses

THE feature that Vinson Steel and Aluminum Company likes best on their Steelweld Shear is the adjustable blade clearance. This permits them to use the one machine for their complete range of thicknesses. They go as low as 26 gauge galvanized material and up to ½ inch mild steel and ½ inch aluminum.

As a leading supplier of metal in North and West Texas, Vinson insists on cuts being sharp, straight and accurate. This requires that the blade clearance be correct for every thickness cut. Because of the unique easy method of adjusting the clearance on Steelweld Shears, the adjustment can be made in seconds.

Another item which is impressive is the low maintenance cost. This machine has been in service for over two years, and the maintenance has been practically nil.

More and more warehouses are installing Steelweld Shears. Usually one will handle a range of work that would require two or more other type machines not built with a fast knife adjustment feature.

GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

4852 East 282nd Street • Wickliffe, Ohio.

STEELWELD PIVOTED BLADE SHEARS

ZYGLO INSPECTS MISSILE RADOMES IN 2 MINUTES—Costly ceramoplastic parts for guided missiles are checked out for perfection in a minimum of time for one electronics manufacturer. When the telltale fluorescent indication shows up under "black light", inspectors know Zyglo has uncovered another defective component. In the case of the radomes, hundreds of dollars are saved by rejecting in the rough molded stage—before costly finishing operations are expended on parts destined for the scrap heap. Early detection also enables this manufacturer to correct processing errors before additional faulty parts are produced. Zyglo serves not only as an inspection tool, but as an "in-process" control check-point as well.

Y-5 PROVIDES "SECOND SIGHT" FOR INDUSTRY—For on-the-spot detection of crack-type defects in rough castings, we know of one company which puts low cost Magnaflux Y-5 Yoke Kits in the hands of their lathe operators. If a part is suspect, it can be quickly checked during "in-process" turning operations. This industrial "foresight" eliminates wasted time and effort on defective parts. Results: greater production economy and real product confidence.

HALLMARK OF QUALITY IN NONDESTRUCTIVE TEST SYSTEMS

MAGNAFLUX CORPORATION

Write for complete details concerning any of the above case studies, (excerpts from MAGNAFACTS), or ask for our new booklet on Lower Manufacturing Costs.

Case Studies:

NONDESTRUCTIVE TESTING SYSTEMS

Checking a printed circuit base with a Magnaflux SO-100 Sonizon Unit

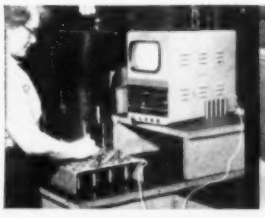
How "silent" sound spots invisible defects

Sonizon, another of the many Magnaflux developed nondestructive test systems, is currently being used to detect hitherto unmeasurable defects in many industrial products. This ultrasonic test instrument employs high frequency impulses to detect sub-surface discontinuities in metals, plastics, glass and other sound conductive materials.

Sonizon is lightweight, portable, easy to use. This remarkable ultrasonic instrument measures thicknesses from one side only and shows readings as a "pip" on the face of a TV-type tube as rapidly as a crystal probe is touched to the test materials. It is as easy to read as a ruler, and besides being far faster than a micrometer, Sonizon provides the additional advantage of giving you a reliable way to make otherwise impossible readings on complex shapes.

Sonizon reduces inspection and production costs by instantly detecting such bothersome defects as: "thin walls" in cast, formed, welded or spun objects; laminar discontinuities; eccentricity in cored castings and cast iron pipe; and, lack of bond between materials used in "sandwich" construction.

If your production efforts are hampered by similar critical defects, it will pay you to investigate Sonizon today. Write for complete information, or request an interview with one of our experienced Magnaflux field engineers.



Sonizon is used in the automotive industry to detect lack of bond between valve lifter bodies and carbide wear plates.

Sonizon quickly and reliably detects any variance of taper dimensions in a machined cast magnesium cone.

Sonizon is used in aircraft maintenance to determine possible corrosion on the wing skin of planes, during regular major overhauls.

Take Your Inspection Problems to the House of Answers . . .

MAGNAFLUX CORPORATION

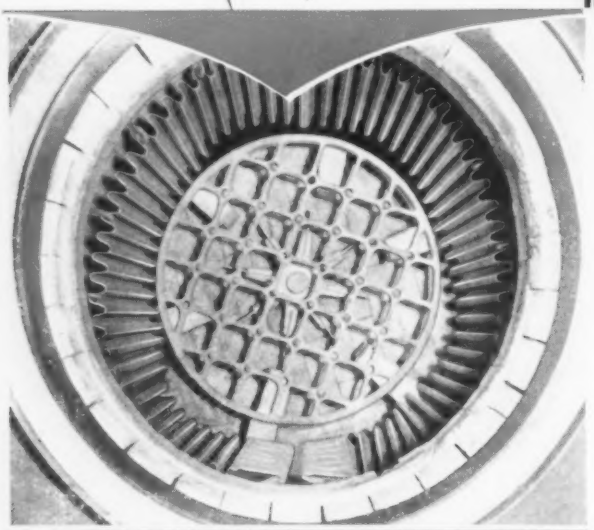
7302 W. Lawrence Avenue • Chicago 31, Illinois

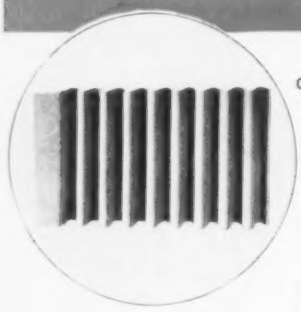
New York 36 • Pittsburgh 36 • Cleveland 15 • Detroit 11 • Dallas 19 • Los Angeles 58

FROM THE OUTSIDE

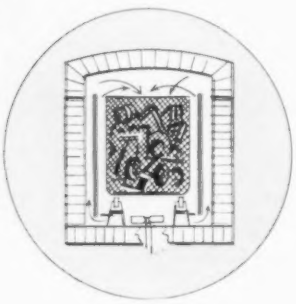
. . . JUST ANOTHER LINDBERG PIT-TYPE CARBURIZING FURNACE

BUT LOOK INSIDE





CORRTHERM elements operate on extremely low voltage. No leakage through carbon saturation. Shock or short hazards eliminated. No complicated mountings required. An exclusive Lindberg development.



Note how CORRTHERM elements serve as baffles to direct forced convection streams through the charge.

No Retort!

Because it needs no retort, this new Lindberg electric vertical pit-type furnace gives you these important advantages:

- **Lower initial cost, no retort to pay for.**
- **No expensive retort replacement.**
- **Downtime for retort replacement eliminated.**
- **Increased production because it heats faster.**
- **Exact atmosphere control maintains work quality.**
- **Versatile, carbon-diffusing and requenching along with carburizing. Adaptable to variety of work.**

All this is made possible by Lindberg's new CORRTHERM electric heating element. For lower initial cost, lower maintenance costs, faster production, better quality control, why not look into this furnace. It's additional evidence that, if you're concerned with the application of heat to industry, better talk it over with Lindberg.

LINDBERG
ENGINEERING COMPANY

2452 West Hubbard Street, Chicago 12, Illinois

Los Angeles Plant: 11937 S. Regentview Ave., at Downey, Calif.
Toronto Plant: EFCO-Lindberg, Ltd., 11 Front Street, East

Here's why...

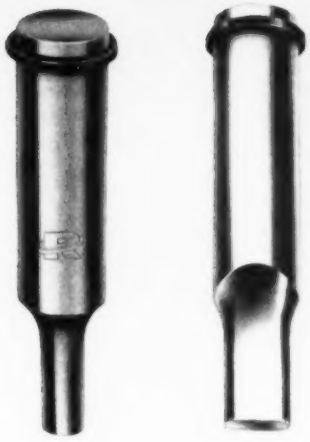
Ring Punch & Die, Inc.

JAMESTOWN, NEW YORK

uses Latrobe's

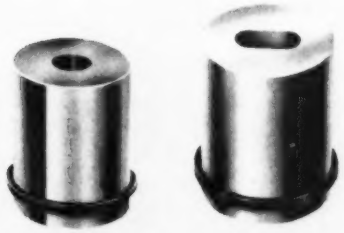
FREE MACHINING HIGH CARBON— HIGH CHROMIUM TOOL STEELS

for Standardized Precision Punches and Dies



TOOL LIFE INCREASED!

Screw machine operation increased from 45 pieces to 80 pieces per hour when machining Latrobe's GSN FM tool steel. In production, the cut-off and form tool life increased over 100% between grinds!



PRODUCTION DOUBLED!

Round hole dies are drilled and taper reamed. Oblong hole dies are milled and counterbored. Again, Latrobe's GSN FM tool steel resulted in savings—production per hour was doubled; cost of drills, end mills and reamers reduced!

EXCEPTIONAL WEAR IN USE!

Exhaustive field tests, conducted by Ring Punch and Die, Inc., have showed that GSN FM punches and dies give exceptional wear in actual production use. No loss of punch life, or chipping, was detected over that normally experienced when punches and dies were made of regular high carbon-high chromium steel without the "free machining" sulphide additives.

GSN FM is an oil hardening high carbon-high chromium steel possessing outstanding non-deforming characteristics in heat treatment. It contains sulphide additives that greatly improve its machinability. These alloy sulphides, as well as the important carbide particles, are evenly dispersed throughout GSN FM by Latrobe's exclusive DESEGATIZED® process of manufacture—your assurance of uniform tool steel quality.

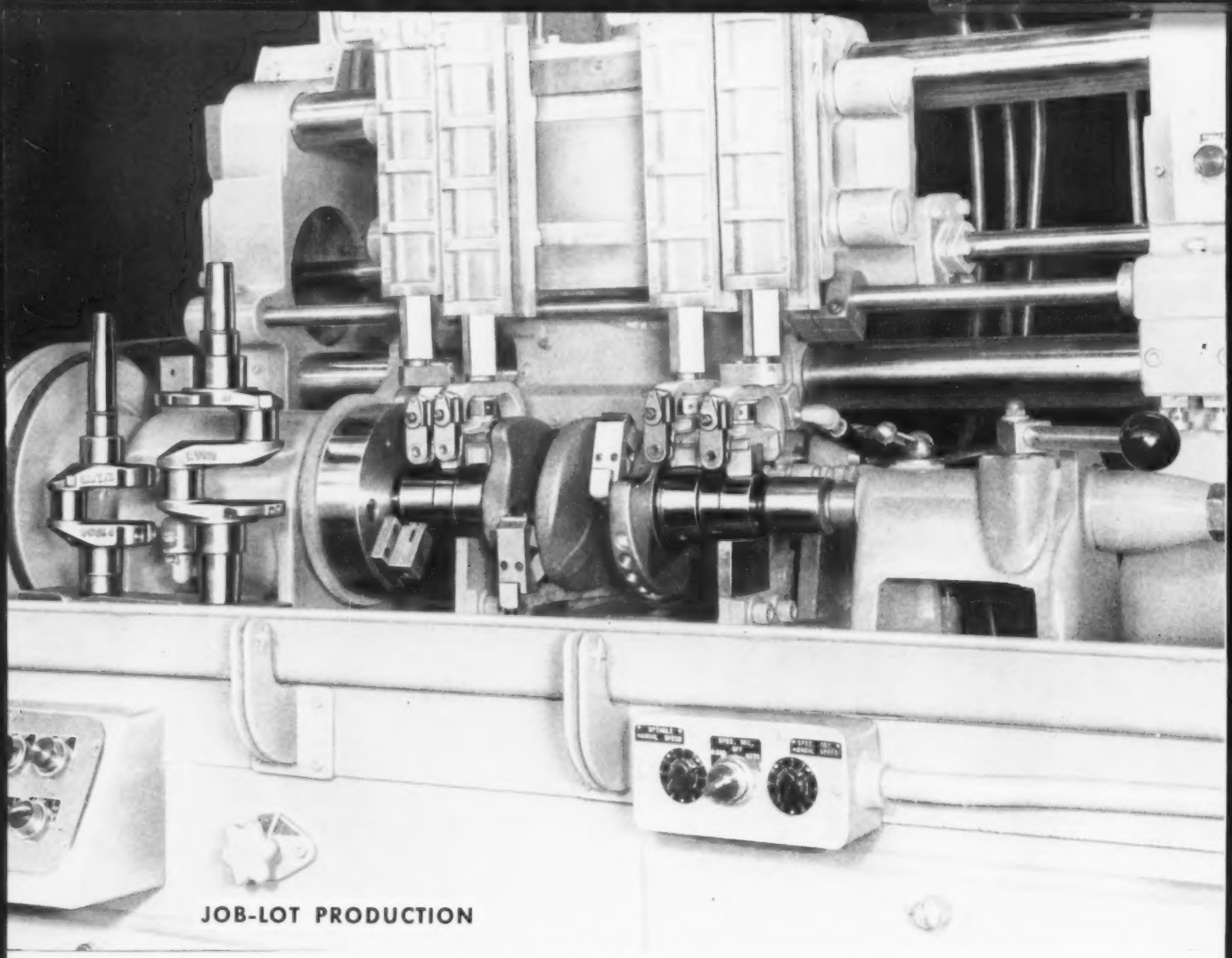
Call your nearest Latrobe representative for complete data on GSN FM and other quality tool steels. A wide range of sizes for immediate delivery stocked at conveniently located warehouses.

Latrobe

STEEL COMPANY

Main Office and Plant: Latrobe, Pa.

Branch Offices and Warehouses Located in Principal Cities

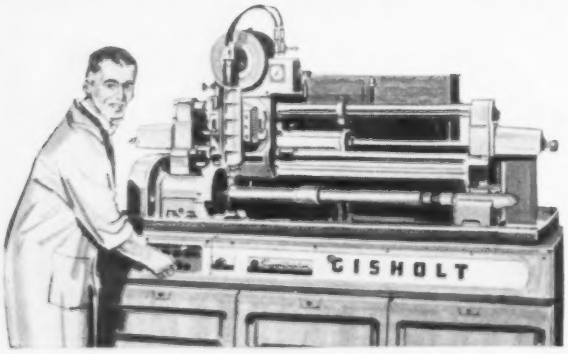


JOB-LOT PRODUCTION

No. 51A General Purpose Superfinisher

CRANKSHAFTS in small job-lots are Superfinished with this setup—holding the piece between centers and driving from a keyway with a faceplate driver. Latch-on follower-type arms Superfinish the crank pins, while the main bearing and oil seal surfaces are Superfinished by standard overhead quills. Main and pin bearings are taken from a ground surface of 30 micro-inches down to 8 or less. Oil seal surfaces on shaft ends are Superfinished to 4 or less. Production: 44 to 53 pieces per hour at 80% efficiency.

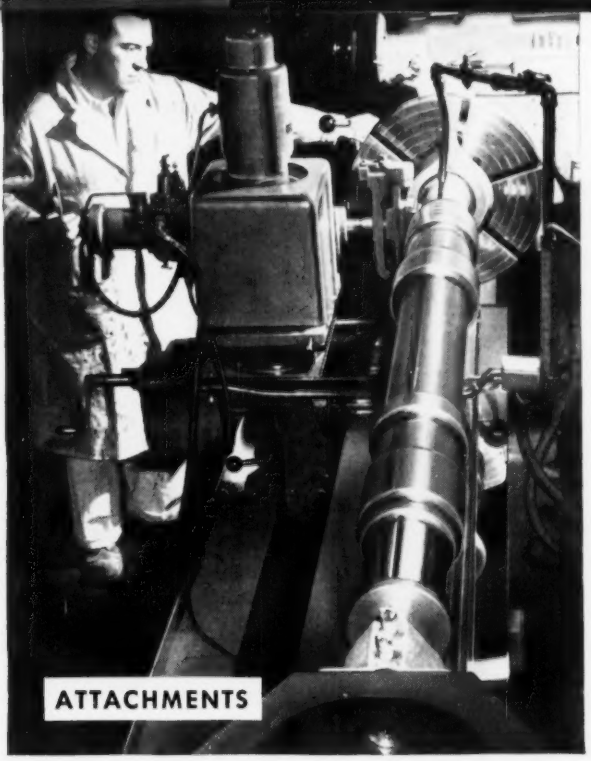
NEED SMOOTHER SURFACES AT LOW COST? See the



BEEN LOOKING FOR AN INEXPENSIVE PROCESS to improve product quality—to help market your product easier against increasing competition?

Gisholt Superfinishing may well be your answer ...it has been for some time for a long list of leading manufacturers.

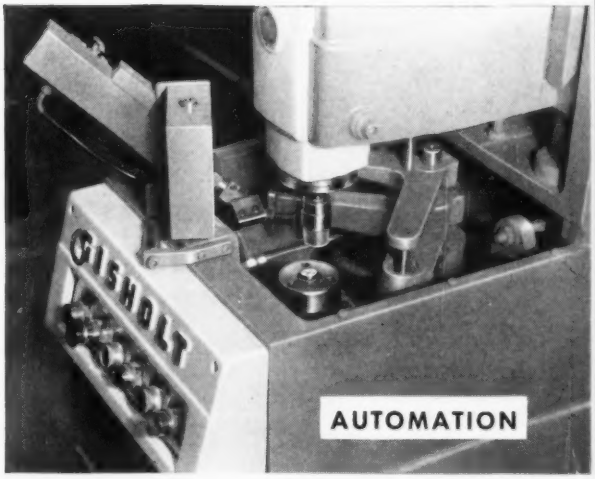
With this modern process, you'll definitely reduce —or even eliminate—the cost and time of grinding, polishing or buffing operations. With the exclusive Gisholt Superfinishing method, you utilize a "scrubbing" effect through an abrasive stone which oscillates as the work rotates. Chatter marks, grind-



No. 4 Superfinisher Attachment

AXLE JOURNALS for railroad switchers are Superfinished with No. 4 Attachment on Gisholt Saddle Type Turret Lathe in this operation. In three steps, lathe finish of 200-250 micro-inches RMS is reduced to final surface finish of 8-10 RMS, removing .004" to .005" stock to eliminate tool marks. Through Superfinishing, 25 switchers logged 30,000 trouble-free hours on journals in first few months.

Superfinished tappet with .005-inch crowned top.



No. 81 High Production Superfinisher

CAST IRON VALVE TAPPETS are Superfinished in long runs on this job, featuring fully automatic handling with a work transfer device. Cup-shaped stones are used, Superfinishing from flat ground surface down to 5 micro-inches RMS or less—and rotating off center to generate .005" crown on the cam end of each tappet. In only 16 seconds floor-to-floor time per piece, the valve tappets are economically Superfinished for longer wear life and better product quality.

NEW GISHOLT MASTERLINE SUPERFINISHERS

ing flats, and amorphous "smear" metal left by grinding are completely removed. The true base metal is exposed—providing longer wear and better performance from your product.

Better still, most Superfinishing jobs are done in a fast, automatic cycle—producing very low micro-inch surface readings in the shortest possible time.

The jobs shown here are typical examples where Superfinishing solved production problems and improved product quality. Ask your Gisholt Representative to tell you about them—and many more—in full detail. Call him today!

WRITE TODAY for 30-page illustrated booklet "Superfinishers," explaining Gisholt Superfinishing process in interesting detail.

MASTERLINE GISHOLT SINCE 1887 GISHOLT

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

A NEW AID FOR COST-CONSCIOUS MANAGEMENT

You can now determine just how much productivity you are losing because one or more elements of the operating cycle of an automated machine are not perfectly timed.

Now you can spot any timing error to within a 60th of a second immediately.

Cycle Analysis

Sheffield's new Monitorecord* system analyzes timing by means of a printed, composite time graph. This shows every start, dwell and stop of each interrelated event in the complex machine cycle – just as it occurs.

Corrective Adjustment

When a Coded Master is laid over the time graph you see just what adjustments are needed and the amount of each. No tedious groping – no costly down-time.

What could serve Preventive Maintenance more effectively than taking such a graph every day? What could save as much set-up time? This system often justifies its cost the first time it is used.

System installation is no problem. It can be applied to machines now in service or it may be built into new machines.

The readily portable Monitorecord is merely plugged into the system receptacle of any machine requiring cycle analysis. It can be moved about at will.

Get all the facts on this profit-conserving idea. Write to the *Sheffield Corporation, Dayton 1, Ohio, U.S.A., Dept. 8.*

*Trademark

7828

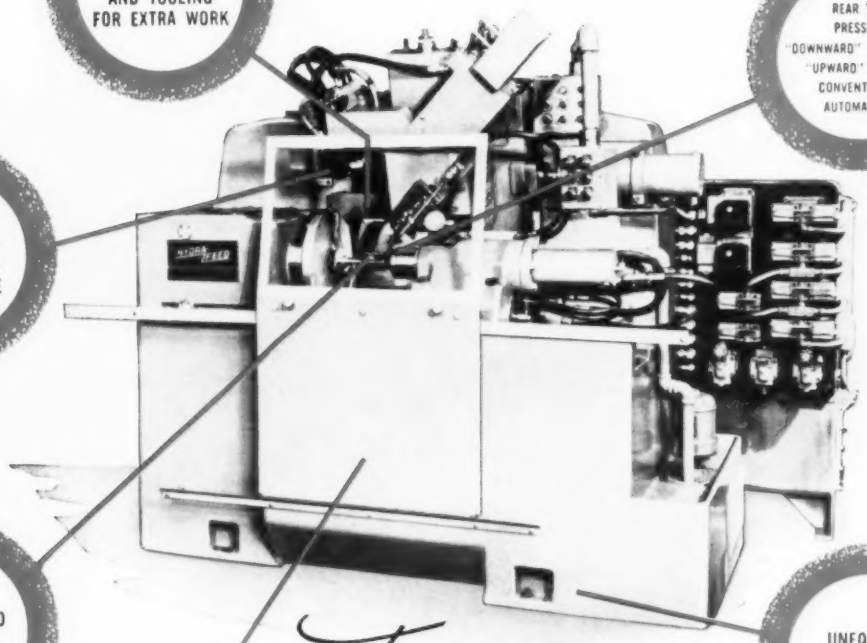
the SHEFFIELD corporation

measurement for mankind

SUBSIDIARY, BENDIX AVIATION CORPORATION

BULLARD

HYDRA-FEED LATHES



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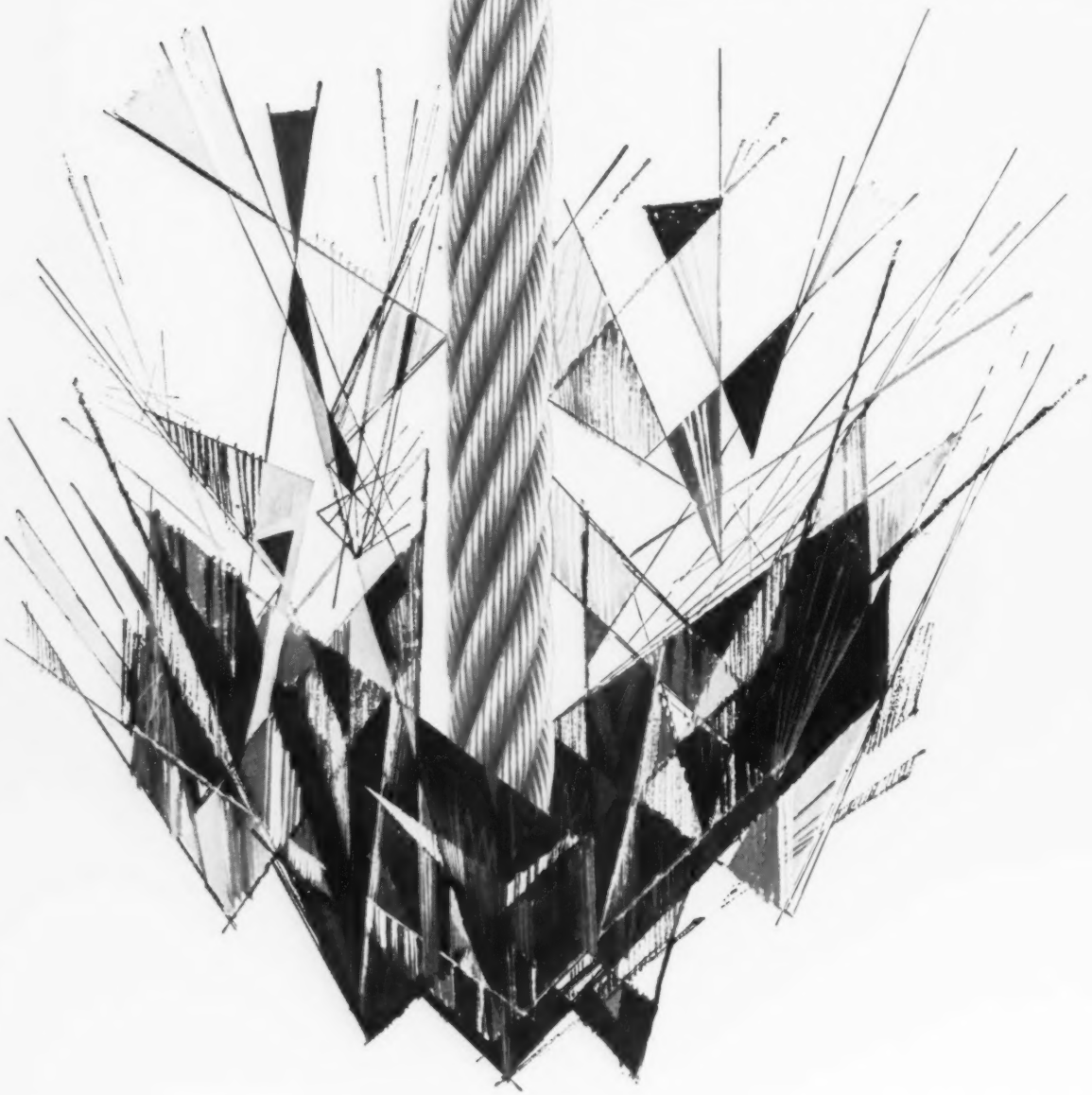

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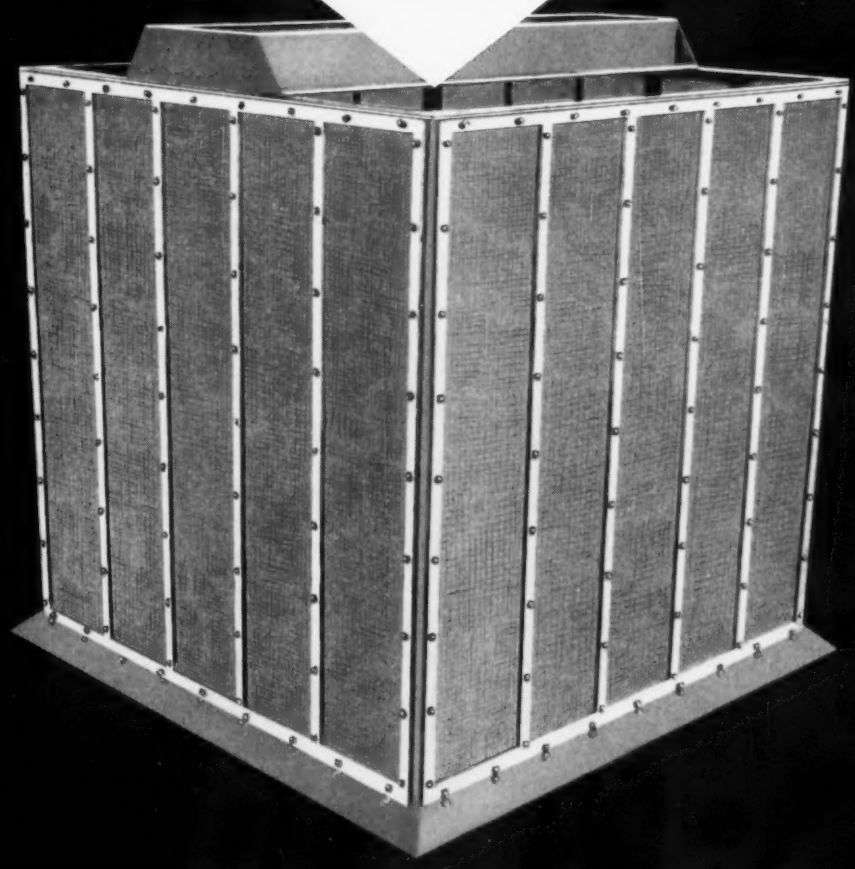
resists attack by strong corrodents in uranium refining process!



Here's how one company solved a tough corrosion problem in setting up a new method of extracting uranium from ores.

Frame members and the 35 mesh screen which covers five sides of these 48" cubical shaped dipping baskets are made of Carpenter Stainless No. 20 for super corrosion resistance.

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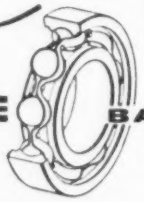
Stainless No. 20 and No. 20Cb

Carpenter No. 20 bars, strip, wire and billets are available also from The Carpenter Steel Company, Reading, Pa.

FACTS

about

NEW DEPARTURE BALL BEARINGS



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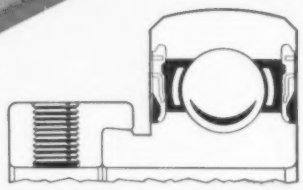
New Departure Pillow Blocks employ the performance-proved New Departure Type AE Adapter ball bearings with spherical O.D. for alignability and steel-reinforced Sentri-Seals for long life protection against dirt or grease leakage.



The bearings are easily applied to the shafting and are positively locked in position with an eccentric cam locking collar and set screw.

BALL BEARINGS MAKE GOOD PRODUCTS BETTER

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Oil Stops Contact Arcing

A new lubricant for electrical contacts and connections is said to be mechanically equivalent to mineral oil, but with much lower electrical resistance. It reduces arcing and burn, prevents contact tarnish and wear, and provides better conductivity in all types of switchgear, especially in humid or other unfavorable atmospheres. The lubricant comes in capsules which can be fitted with special applicators.

Fast Check Ash, Sulphur

Coal and coke can be checked quickly for ash and sulphur content with a new high-temperature process. For example, coal ashing is said to take only 10 to 15 minutes, compared with one to two hours required with other methods. The new technique pyrolizes coal in a high-temp furnace and uses a nitrogen stream to remove volatiles. Complete oxidation in a stream of oxygen follows this.

AEC Wants Budget Relief

Government agencies accustomed to big buying programs are already protesting President Eisenhower's instructions to hold next year's spending to this year's level. The Atomic Energy Commission complains this means a $400 million cut from what it planned to spend, wants the White House to exempt it from the economy rule. Other big buying agencies, such as the Air Force, are expected to follow with similar pleas.

Thermocouples Hold Tight

Want better thermal contact between thermocouples and workpieces? A new portable rig works from a standard power supply to weld thermocouple wires onto the work you want to observe. It's said to eliminate a number of temperature-measurement problems, such as errors caused by inertia of the thermocouple bead on heating and cooling.

Price Probe No Bargain

Talk around the steel industry is that the Congressional investigation of prices may drag on until Christmas. One factor adding to the delay: Summer vacations of top steel executives, who are boning up on cost facts as they wait to be called. Price tag for the whole show certainly won't be cheap; executives' time, travel costs and incidentals will all add up.

Swing To Economy Cars

Look for another major auto firm to come up with an announcement soon on what, if anything, it intends to do in the economy car field. A staff is busily at work preparing a "presentation" to management, evaluating the small car market and recommending a course of action to the company.

West Is Hot Steel Market

Strength of the western steel market is amazing the experts. Peak operations in western mills aren't enough to meet demand. Semi-finished products plus plate and structural shapes are being shipped in from eastern and midwest mills to take up the slack. In the West itself, scrap is being shipped from California as far east as Utah at freight rates up to $14 per ton. This is almost without precedent since World War II.

Tool And Die List Lags

The long-awaited directory of tool and die manufacturers being compiled by the Commerce Dept.'s Metalworking Equipment Div. and the industry isn't dead. But it won't be available for many months; more pressing business has slowed it down. Big question: Will top Dept. officials O. K. funds to publish it when it's ready? Last time the tool and die makers picked up the tab.

Machines Stand A-Blasts

Nearby atomic blasts produced little serious damage to basic machine tools firmly anchored in concrete, although hand valves and control levers were broken by falling debris. In one test, a 200-ton capacity hydraulic press, 19-ft high, stood behind a brick house in an area subjected to 5 psi overpressure. The house was demolished; the press was almost undamaged.

A coke oven battery reversing machine designed and installed by the Wilputte Coke Oven Division, Allied Chemical & Dye Corporation.

CLEVELAND makes a reversing machine behave

HEART of a coke oven or an open hearth furnace is the reversing machine. On it depends the circulation of air, heating gas and waste gas through ovens, checkers and furnace, first one direction, then the other. Vital to the operation of the reversing machine is its drive. Because of its dependability through years of trouble-free performance, the Cleveland Worm Gear Speed Reducer has proved ideal in this service. Year after year, a Cleveland transmits motor power smoothly, uniformly and at exactly the reduction required in the frequent automatic reversals of the regenerative cycle.

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Metal Wall Construction Wins Building Code Recognition

It's a Big New Metalworking Market

Time and effort by metalworking groups have pushed revisions of building codes.

Stainless steel, aluminum and porcelain enamel will get major lift.—By F. J. Starin.

■ The Common Council of Buffalo, N. Y., was stirred recently by a debate over use of aluminum panels on a 20-story skyscraper to be erected in the city's business district.

The issue: The city building code required an 8-in. concrete backing. The builder considered this unnecessary and applied for a variance.

The Buffalo Federation of Labor was strongly opposed. But after extensive testimony, hearings and examination of what had been done elsewhere, the Council approved the variance of four in. of concrete by a vote of 13 to 1. The mayor hailed the move and signed the regulation.

Progress Is Good — Cases like this are becoming more common as metals near the end of a successful fight to get building codes modernized. The goal: To permit metal curtain walls, primarily stainless steel, aluminum and porcelain enameled, to compete on a strictly cost and efficiency basis with other more traditional building materials that dominate construction.

Most metal men are more than satisfied with the progress made in the last 10 years. The committee of stainless steel producers, American Iron and Steel Institute, points out that two-thirds of the country's 2200 cities have modified their building codes.

The Goal—The ideal code, they say, is: Walls from 3 to 20 ft from other buildings should have 2-hour fire resistance without windows, 1-hour with windows; 20 to 30 ft from other buildings, 1-hour fire resistance; and 30 ft or more, simply

Where Metals Have Won Building Recognition

These cities and states have adopted building code revisions to permit non-combustible curtain wall construction:

CITIES: Boston / Boise / Cincinnati / Columbus
Dayton / Denver / Kansas City, Kan.
Los Angeles / Miami / Minneapolis
New Orleans / Oakland / Portland, Ore.
Richmond / Salt Lake City / Seattle
Shreveport / Topeka / Wichita / New Haven

STATES: Indiana / Ohio / Virginia / Wisconsin

non-combustible with no specific fire resistance.

The average building code which faced the industry 10 years ago, and still does in many places, dictated the kind and thickness of material which could be used, rather than standards of performance to be met.

A Break for Glass—And there were inconsistencies. Glass windows of unlimited size, with almost no fire resistance, were permitted. But walls required use of masonry with 4-hour fire resistance.

Metal companies point out that a number of structures were built using metal curtain walls under old codes where publicity overshadowed cost. They are sure this market will really blossom as more codes are brought up to date.

Advantages — William G. Kirkland, chief of engineering div., American Iron and Steel Institute, points up several advantages:

(1) Thinner walls mean more rentable space. A savings of six in. in thickness of a wall in a 100 by 200 ft building, 20 stories high, renting at $6 per ft, per year, means an additional income of $36,000 per year.

(2) Metal panel walls can be erected faster. In New York, a 26-story steel frame building was entirely clad with 1800 metal panels in 6½ working days.

(3) In most cases work can be done from the inside without any scaffolding, in any weather.

(4) Maintenance is easier.

(5) Where backing is not required, erection is usually cheaper.

Associations Act—Steel, porcelain enamel, and aluminum associations have been in the forefront of the fight to gain acceptance.

The National Board of Fire Underwriters recommended building code changes in line with metalworking recommendations in 1955, and to date some 125 to 150 municipalities have adopted changes.

The Building Officials Conference of America recommended the changes in the 1957 amendments to its suggested building codes. It is expected that most of the 250 communities basing their codes on BOCA will adopt the changes.

Both the Southern Building Code Congress and the International Conference of Building Officials have approved similar amendments. A member of a metals association says 80 pct of U. S. cities follow one of these four code groups.

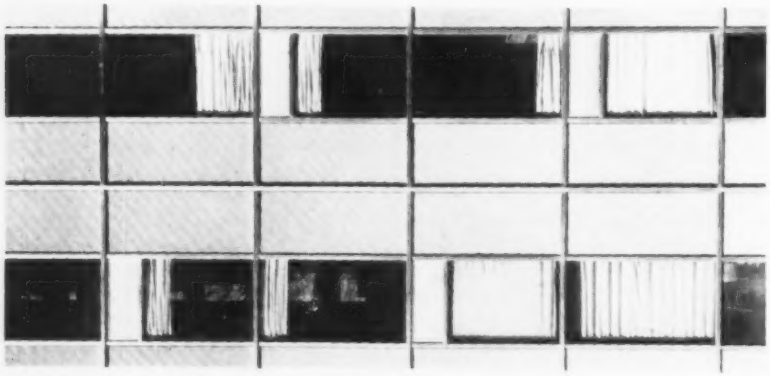
N. Y. Recommends—The New York State Building Codes Commission, an official advisory group, is recommending more equitable building code revisions to all of the state's political subdivisions. At present about 230 communities have agreed, with an average of one per week still climbing on the band wagon.

The Building Research Institute, with 300 members including manufacturers, architects, engineers and builders, says the reason for the lag in building codes is metal curtain walls "sprung to full bloom almost overnight." But they point out that we still "badly need building code revisions in many large cities."

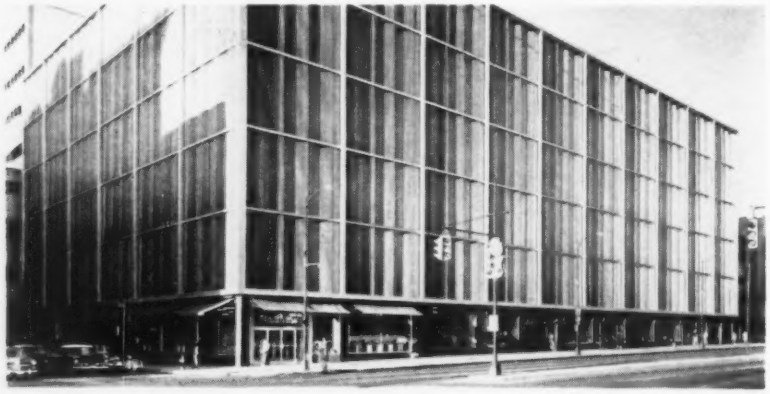
Large Cities Lead—More large cities are making desirable changes, strengthening proponents in other cities. The new Detroit code is recognized as one of the best. It is based on the code of the Building Officials Conference of America. It took a total of five years and involved more than 200 participants.

Philadelphia Story — There are still some tough nuts for metalworking to crack in various cities where brick and masonry interests are strong. One case in point is Philadelphia where a revision has been stalled for over a year.

Opposition is centered in the brick and masonry interests. John B. Kelly, head of the colorful and famous Kelly family, and a leading brick contractor, has been a factor in opposing changes.

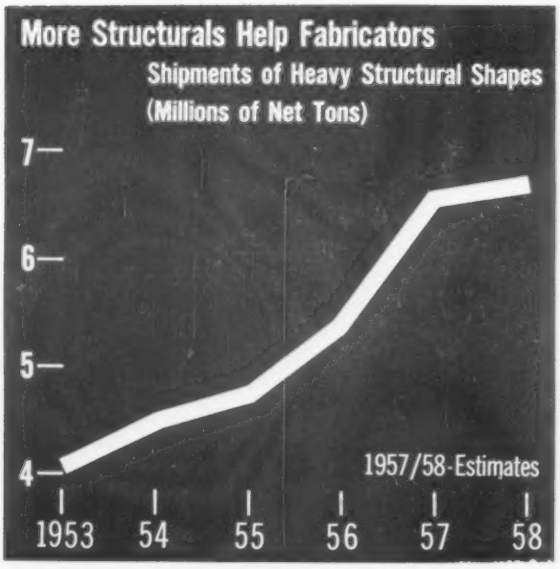


PANELS: When codes are modernized, buildings are more attractive. These panels, and those on p. 67, are colored porcelain enameled steel.



ALUMINUM: Metal walls are cheaper to erect and maintain. Thalhimers Dept. Store, Richmond, Va., is clad in gray-anodized, fluted aluminum.

Bethlehem Steel Co. Photo



Source: American Institute of Steel Construction

Pressure Eases on Fabricators

Better and more regular shipments of plates and structurals give fabricators breathing space.

Heavy items are still hard to get. Fabricators also feel slight demand easing.—By R. D. Raddant.

▪ Fabricators of structural steel and their customers are beginning to sense a little breathing space.

It isn't that business is off. Backlogs are still way out and bookings are up to or ahead of shipments for most of the year. Easing in the tension comes from a greater availability of materials.

Deliveries Regular—Most fabricators still have a problem in wide flange structurals and sheared plate. Lighter sizes are in relatively plentiful supply and don't cause any problem. But even the heavier items are coming in with more regularity and fabricators can count on definite shipments.

What it means is that fabricators are getting enough steel, and in regular enough shipments, so that they can plan better and make more definite delivery promises.

Backlogs Stay High—"Our backlog picture has not changed much," reports one eastern fabricator. "But we have places to fill in beyond six months. Mills are sticking to their obligations and we have geared ourselves to take bookings on mill promises. There is a little softening, but that is typical."

Another fabricator specializing in bridge work reports his firm can book some more tonnage for eight or nine months in advance. But he warns that the Federal highway program has started to come through, says the bulk of his orders are for the primary road system.

"And this should accelerate," he points out, as the milti-billion dollar program begins to get out of the planning stage and into the construction stage.

Balance Approaching—Another smaller fabricator finds that warehouses now can supply even wide flange beams and heavy plates, although not to the point where they could be called easy.

The American Institute of Steel Construction says the supply and demand for heavy structural shapes and plates is "coming closer into balance and on a national basis is virtually accomplished."

This statement may be on the optimistic side and may come as a surprise to some hard-pressed fabricators.

L. Abbett Post, AISC executive vice president, concedes "there are some local exceptions to the national picture."

Bookings Off—Although the highway program is starting to be felt, fabricators have observed some easing in new orders. Bookings fell off from 360,351 tons in April to 291,750 tons in May. Shipments in May were 329,626 tons. For the first five months, however, bookings were slightly over shipments.

Fabricators for industrial buildings have noted stretchouts in expansion plans and a very few cancellations. Business is still very good and backlogs heavy, but fabricators are now able to make firm plans and promises—and carry them out.

HUSTLER: B-58 exemplifies trend to steels in high-speed aircraft. New models will lean even more to steel.

Supersonic Speeds Need Steel

The higher and faster jet planes and missiles go, the more plane makers look to steel.

Supersonic materials now rank aerodynamics in priority for research.—By T. M. Rohan.

■ Stainless steel is beginning to fulfill some of its promise for aircraft building as jet planes tackle the awesome problem of the heat barrier.

The stainless steels are coming into greater use, in many cases replacing aluminum in structural parts of the airframe. Titanium is being used extensively in hot engine parts, accessories and on some structural parts. Steels developed for turbine blading are now going into structural parts.

Percentage Multiplies — Latest type planes are tending to use more and more steel parts and all-steel airplanes are actually on the drawing board. New planes already in the testing stage have 70-75 pct steel compared to the historic 15-20 pct.

For every pound of aircraft weight now produced, the industry consumes 2 lb of aluminum, 2 lb of alloy steel and 4 lb of carbon steel. This of course includes jigs and dies, spare parts, scrap engines and fixed equipment. (For latest on high temperature aluminum metallurgy, see p. 76.)

Look at Hustler—Probably the showpiece of the new aircraft steel era is the B-58 Hustler, the U. S. first supersonic production bomber, now being turned out by Convair. This plane was specifically designed to take advantage of stainless steels and uses more per unit than any plane yet built. The type of steel used is a precipitation hardening "PH" type which is shipped from the mill in "soft" condition for fabrication. After fabrication it is given a moderate temperature age-hardening treatment.

A thin sheet of 0.005 to 0.015 in. stainless forms the wing skin. This is too thin to stand much air pressure so is brazed to stainless honeycomb core for support. The honeycomb cells are made from strip 0.001 to 0.0025 in. Thus heat resistance and structural strength are combined and the cells can also hold fuel. The Hustler also has new General Electric J-79 engines with variable pitch blades.

Trend Established — A newly built experimental fighter, the F-107, is practically all stainless in its structural members and in wing surfaces. It has not been put in production and probably will not be immediately, due to Air Force economies and shift toward missiles. But it shows the trend.

Another rocket-powered piloted research plane now being built by North American will be almost entirely steel. Dubbed the X-15, it is destined to take off next year and fly higher and faster than any piloted aircraft in history.

A new Navy Fury jet attack plane being built at North American's Columbus, O. plant uses stainless steel fuselage frame members to best withstand engine heat. These U-section "Longerons" are heat treated to 200,000 psi, are 60 in. long and about 2½ in. wide.

Tool Steel Used—Another plane being developed at Columbus, the Navy A3J attack bomber, will probably use ultra high strength steels since it is expected it will have twin jet engines.

Experimental tooling is being developed to permit use of tool steels for another plane, the Navy T2J jet trainer. Plane is being built now with conventional materials because tooling has not been perfected for 260,000 psi steels. The dilemma, in a word, is what kind of tooling do you use on tool steel.

Materials the Problem—On the whole subject of materials for aircraft, designers are at the crossroads and looking for the answers. Materials research now carries a higher priority rating than aerodynamic research because it's a more pressing problem.

Within the steels alone, producers are working over possibilities of hot-work die steels, high temperature superalloys, the PH grades, hard-rolled stainless steels,

or a hundred variations of them. For example, Vanadium Alloys is marketing its Vasco Jet 1000 as an aircraft material now. The same material has been a successful hot-work die steel for almost two decades.

Supplying Problems — For the steel producers, supplying aircraft quality on new alloys is no picnic. After the stainless or alloy is worked out, the planemakers want taper-rolling to save machining. And after that, extrusions come into the picture for small "impossible contour" structurals.

Designers are already working with cobalt and nickel base alloys to their present limits of about 1650°F for engines. But the metallurgists are looking for a metal for the 2000° to 2500°F range. Best bet seems to be molybdenum if anti-oxidation coatings can be developed, or ceramics.

The problem is basically two-fold—airframes and engines. Airframes must stand heat and strain stresses of flight up to Mach 4 and in sub-zero weather of space. Hotter engines mean more power with new jets turning out six horsepower for every pound of weight.

Missile Problems—In the shift in emphasis from aircraft to guided missiles, the problems are similar. Major differences are that manufacture must be precise for long range accuracy and there need not be a cool spot for the pilot.

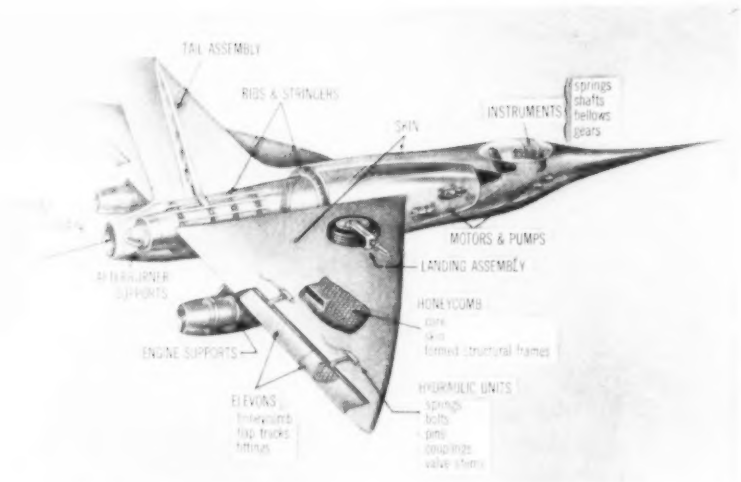
Counting on Steel—Much of the structural future of aircraft lies at the present time in steel, H. A. Storms, chief engineer, North American Los Angeles Div. told THE IRON AGE.

"Here at North American," Mr. Storms said," we are counting heavily on both stainless and high strength hot-work die steels in designing our future planes. As speeds and altitudes of planes increase, so does the structure temperature. We have reached the point of no return on aluminum and magnesium metal planes.

"Stainless steels, the high strength hardenable grades particularly, appear to offer the maximum design efficiency. These steels offer high temperature resistance, high strength, good stiffness, weldability and wide flexibility in product form. Such steels appear to be useful up to temperatures of 1000°F, which should take care of any aircraft planned for the next eight to ten years.

"While the hot-work die steels offer some advantages even over stainless, they are not corrosion resistant, and for this reason alone these steels cannot be considered for certain phases of design.

"It would be unfair to eliminate all other high strength metals from the picture, but, at this time, the wide variety of forms in which steel is available in which other metals are not, gives the steels a definite advantage."



JET AGE FOR STAINLESS: Diagram shows applications in typical jet plane for stainless steel. It's a trend brought about by high speeds and temperatures. Metals now have priority in aircraft research. (Armco photo.)

Materials Needed to Match Supersonic Speed

Mach Number	Structural Design Temperature °F	Alloy
1-2.5	Room temperature to 350	Aluminum Alloys
2.5-3.2	350-600	Titanium Alloys Stainless Steel
3.2-4.2	600-1000	Stainless Steels Tool Steels
4.2-5.5	1000-1600	Super-Alloys
Above 5.5	Over 1600	Molybdenum and Ceramics

Outlook for Titanium—Titanium alloys are the favored material for higher temperature in engines, afterburners, manifolds and other "hot" components and parts near them. Improvements in the properties and fabrication of this metal have come from scanty metallurgical knowledge to volume production of aircraft quality in a decade and a half.

Even though the charts show aluminum is through at about 350°F, aluminum producers don't agree. One new alloy to be announced soon has better properties at 400°F than at room temperature, thus extending its usefulness.

Avery Adams Makes His Move

J&L Seeks Wider, More Profitable Markets

Acquisition of Rotary and Cold Metal Products may be only the beginning.

J&L is out to increase its capacity, improve its profit picture.—By G. J. McManus.

■ Avery Adams is starting to push the pieces together. Steelmen doubt that they have seen the whole picture, but part of the plan has been tied together.

Since Mr. Adams became president of Jones & Laughlin Steel Corp. last October, the Pittsburgh company has moved like this:

Chronological Steps—Dec. 1956: Agreement for the acquisition of Rotary Electric Steel Corp. by J&L was revealed.

April 1957: Rotary agreement was wrapped up as shareholders gave J&L board the right to issue 3 million more shares of common stock. At the same time, the authorized indebtedness of the company was increased from $180 million to $300 million.

June 1957: Plans for the acquisition by J&L of Cold Metal Products Co., Youngstown.

July 1957: J&L announced it was buying land and buildings near Canton, O.

July 1957: J&L purchased a tract of land in Texas as possible steel mill site.

Plans for Stainless—The Stainless Steel Div. of J&L produces stainless (73 pct of its sales dollar) and alloy steel. Sixty pct of the stainless market is in flat rolled products and Rotary has no flat rolling facilities.

The latest moves by J&L will round out the stainless operation with needed finishing facilities.

AVERY ADAMS: The pattern at Jones & Laughlin begins to take shape.

Facilities Dovetail—Cold Metal Products and J&L complement each other in several respects. The Youngstown company is a non-integrated producer of high carbon strip and other specialty steels. J&L is an integrated producer; its strip line is limited to the tonnage types, produced on tandem mills and slit into narrow widths. "There are probably no two mills in the industry that fit together as well," said one steelmaker.

Financial Setup—J&L has the financial flexibility for this and for much more sweeping moves. Of the 3 million common shares authorized in April, something under 650,000 went to Rotary stockholders in a four for five transfer. Another block, probably smaller, is going to Cold Metal Products owners. This leaves about 2 million shares authorized but not issued. At current market value, these equal over $160 million.

The authorized indebtedness picture is also suggestive. At the end of last year, J&L was nearly $47 million under its debt ceiling. With the limit raised by $120 million, the company has a cushion of $170 million in its debt management.

Willing to Do Business — Mr. Adams and J&L have shown they are not afraid to spend money. They have also indicated a liking for the bargains offered by existing mills. New ingot capacity is estimated to cost $300 a ton. Existing capacity is carried on the books of the steel industry at something like $50 a ton. For 300,000 tons of electric furnace capacity at Rotary, J&L gave stock with a value of about $40 million.

A second point indicated by recent moves: J&L will not wait for a market or a company to catch

fire before going after it. It is acquiring Cold Metal Products at a time when the strip business is dragging. It took over Rotary after a year when the Detroit mill's shipments dropped 40,000 tons and its earnings more than 60 pct.

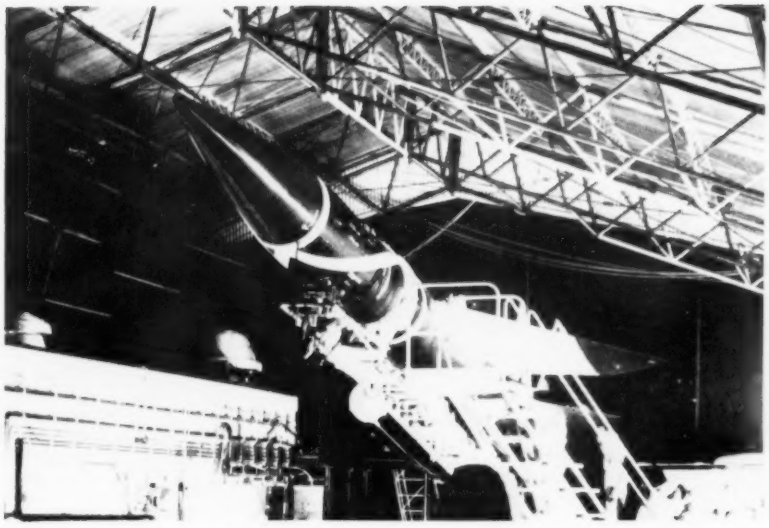
Want Profitable Products—The third point which Mr. Adams has stated and which recent moves underline: J&L is leaning toward the more profitable steel products. Base price of cold rolled carbon strip is $143 a ton. High carbon spring steel of the type made by Cold Metal Products runs from $180 to $370. Cold rolled stainless strip runs from $800 to over $1300 a ton.

As Mr. Adams states pointedly: "Selling price, gross profit margins and return on investment for stainless steel products are higher than for carbon steel."

One thing is certain. J&L will not stand still with Avery Adams as president. A company that just holds its own is really losing ground. Mr. Adams learned this old chestnut by heart in his time with Pitsburgh Steel. He saw how a period of feet dragging had left the company with its finances snarled, its equipment run down and its market narrowed.

Record Speaks—The spectacular recovery of Pittsburgh Steel during his stay has certain parallels with the present situation. Pittsburgh Steel in 1950 had 40 pct of its shipments in semifinished products and hit 12 pct of the total steel market. Rotary Steel last year had over half its output in semifinished and hit only 20 pct of the stainless market.

In most respects, however, the two situations are dissimilar. At Pittsburgh Steel, Mr. Adams took over a high cost, single plant operation. The company had to diversify to grow. At J&L, he is dealing with a low cost, multi-plant operation. Much of its growth in the immediate future will be along existing lines.



CHANGES: Missiles like Boeing's Bomarc mean changes in aircraft plans.

Aircraft Reacts To Cutback Drafts

Plane builders have found the Air Force really means to reduce its aircraft buying.

Many are already making moves to convert to other forms of production.

▪ Aircraft manufacturers are finding the Air Force is both firm and serious in its plans to cut back sharply on plane procurement.

Although the handwriting has been on the wall for many months, several big Air Force contractors could hardly believe their ears recently when Maj. Gen. David H. Baker (Chief, Air Materiel Command) bluntly warned that the Air Force changeover from manned aircraft to missiles will result in fewer orders and fewer contractors.

Subcontractor Scramble — The changeover, already under way, is gathering speed. By the first of 1958, the conversion will be well along. Most larger aircraft contractors are already taking steps to convert to other forms of production.

Subcontractors will have to scramble even faster to stay in the Air Force procurement picture by next year. This is because prime contractors, operating at reduced rates, will tend to take on themselves jobs formerly subcontracted out.

To impress upon the industry how serious the cutback plans are, Air Force Secretary James H. Douglas recently summoned aircraft manufacturers to the Pentagon to tell the grim news in detail.

Reaction at Curtiss — Actually, the Air Force will continue to spend as many dollars as in the past, but fewer companies will share.

The Curtiss-Wright aircraft empire has already acted to offset the coming cutback in orders for military planes.

The firm bought 150 square miles of undeveloped land east of Reno, Nevada, for a vast missile testing laboratory.

Foreman Gets Feature Billing

Survey Shows His Voice Is Stronger

Management assigns an ever more important role to the first-level supervisor.

He's quizzed about contract clause changes, may interview in job hiring and often can recommend discipline.

▪ What are companies doing to make the foreman feel he's really part of management?

Quite a bit—and more of it than before—according to a recent survey conducted by the Employee Relations Bulletin of the National Foremen's Institute. The results (see box) when compared with an earlier survey indicate there's been a dramatic rise in management's efforts to build up the status of the foreman's job.

Punch No Clocks—As a result, today's first-level supervisor often doesn't need to punch a time clock or report his working hours at all. He usually gets a chance to share in management meetings. Frequently he hands out the pay checks to his crew which averages 30 employees. If he works for a larger company the average is 35, for a medium-size firm it's 34, and for a small firm, 24.

Generally the front office provides him with special training, gives him a company policy manual and a wide variety of literature to aid him in his work. (The publications companies distribute to supervisors include newsletters from outside services, company policy statements, general employee literature, and company publications for management.)

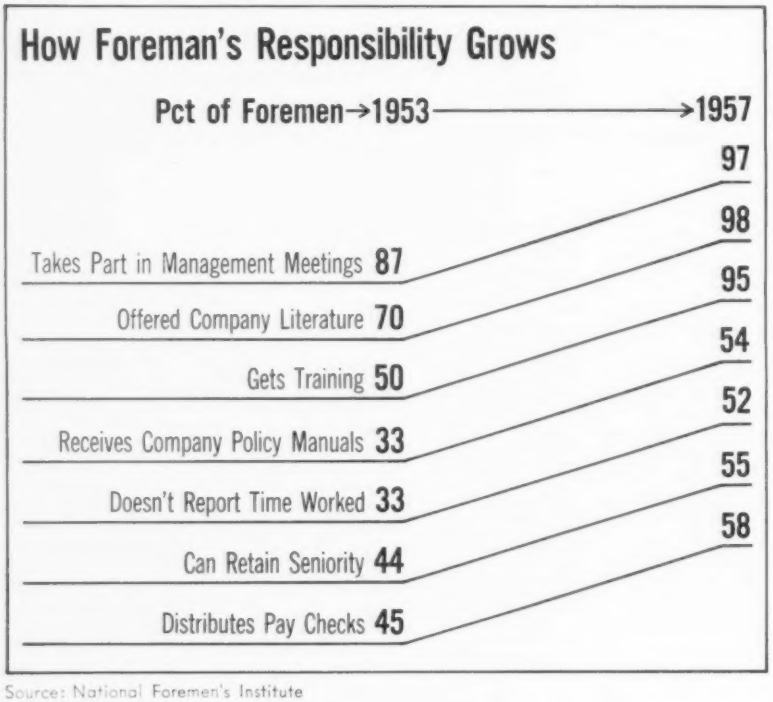
The modern foreman can often make specific recommendations on disciplinary action for his employees and sometimes determine what it should be. He can, in some cases, interview prospective employees and may decide who's to be hired.

Advice Wanted—There are few companies today where the foreman isn't asked by management for his views on any amending of the labor agreement. Such suggestions are gathered through day-to-day contacts in 45 pct of the companies quizzed, at meetings in another 45 pct, and on forms at 8 pct of the companies. Only 2 pct of the firms indicated they don't solicit the supervisor's views on contract revisions. What's more, 30 pct ask his opinion through more than one method.

The foreman's sense of well-being is also being bolstered by the front office. He often can retain his job seniority after promotion, at least during a trial period. If he doesn't make the grade as foreman, he usually can transfer back to his old job or to a new assignment. He's frequently covered by a leave of absence plan, either a formal or informal one.

However, although much has been done to make the foreman's lot a happy one, there are a few arid areas. He can often participate only to a limited extent in suggestion plans. He sometimes isn't covered by merit rating. And he's bound by compulsory retirement rules in the majority of instances.

The Fringe Roadmap — Gains for foremen are found to be greatest in the South. The Middle Atlantic and New England areas are a little less sensitive to the growing interest of the foreman in improvement his management skills than are the South and the West. The Midwest area falls between the two extremes.



Source: National Foremen's Institute

Fringe benefits for foremen have shown the least gain in areas outside of continental U. S. In Canada and Hawaii, for example, time clocks are still the norm and merit rating systems are not a big factor. However, even in these areas management is providing a variety of literature for the supervisor and offering him many types of job-related training.

The foreman's response to management's overtures can be documented. He's casting a cold eye on union organization—in less than 1 pct of the 373 firms replying to the survey was the foreman a union man.

Withholding Laws Face Tightening

Congress is considering strengthening the internal revenue laws to crack down on employers who fail to turn over to the government taxes withheld from employees.

Chances are that the legislation won't win final approval until next year. Members of the powerful House Ways and Means Committee have tentatively approved the legislation. They are now drafting changes to make sure that the "crackdown" authority won't be used against honest employers who are unable to make the payments due to circumstances beyond their control.

Delinquent employers now owe the government some $300 million in income taxes and social security taxes withheld from employees. The Administration-backed measure would permit the Treasury Dept. to make it a crime if an employer kept withholding taxes after being ordered to turn them over.

It would apply only to future tax collections, not to the backlog. Present laws permit employers to be punished only if the government can prove they "willfully" withheld the money from the government. The proposed bill would permit the Department to order a delinquent employer to put his tax payments into a separate government trust bank account each payday.

Needed: A Merger Of Merit Plans

There are two methods for deciding whether to give individual workers a raise.

But, maybe the best solution is to combine good features of both.—By M. A. Barone*

▪ How do you decide one man deserves a raise and another doesn't, particularly when both are in the same group, doing similar jobs?

Management's answer, for the most part, has been to set up a wide variety of systems to rate or appraise individual performance. We can lump these systems under the broad category of merit programs. There are two approaches: Qualitative or merit rating; quantitative or measured day work.

The Intangible—Qualitative, relies heavily on individual judgment. How the boss "feels" about an employee's work; how he rates this with his own yardsticks of performance. Advocates of this plan say it gives management greater flexibility, allows for intangible factors such as cooperation, personality, leadership, work pressure, adaptability.

But, measured day work enthusiasts contend too many merit rating systems are nothing but idle fantasy. They blast the committee method as being a "rump technique" that compounds the error and provides more people to share the blame when the plan breaks down.

The Concrete—The school of measured day work is content to throw out all subjective factors and concentrate on units of measured performance. For example, clerical personnel would be rated by the number of lines they type, the paper work they process, or the units of posting and filing they complete. The productive employees would get the raises.

Both Have Merit—There's something to say for both sides. Most of the merit rating plans in use today are subjective. Many are "Jerry-built." That is, they have not been proven by any rule of measured performance. There are many plans where rating factors were pulled out of the air by a committee, or copied from someone else. Almost all of today's plans are vulnerable to personal feelings. But neither is measured day work practical for salaried workers. Is there any solution? Yes, a merger of the two plans.

To merge the best features of the plans, its a good idea to count the intangibles of the subjective plans (job knowledge, teamwork, work pressure, emotional balance), and then set up a plan in which the factors used are only those having high statistical correlation with measured performance.

Mathematical tools are available to validate intelligence tests, aptitude tests, and surveys. The same can be done with rating factors. A control group is set up where measured day work is feasible. Then, various merit rating factors are selected and tried. The result is a number of tested subjective factors that predict job performance.

It's Practical—The important thing is to develop a merit rating plan in which the factors chosen have a practical degree of association with the units of measured day rating. By using a regression formula, $ZY = .50\ ZX$, the points can be converted to values of measured day work or vice-versa. There is a standard error in associating the two scales.

*Management consultant.

Aluminum Powder Arrives

Aluminum powder metallurgy products, developed by Alcoa, will function at 900 F.

Available in many mill forms, and three different alloys, it is expected to open the door to new high temperature markets.

▪ Aluminum is pushing its thermal barrier up. The latest drive moves the roof to 900°F. This is the top temperature at which new aluminum powder metallurgy products, developed by Aluminum Co. of America, will function efficiently.

This is 300 to 400 degrees above the maximum range for conventional aluminum alloys, says Alcoa.

Alcoa is selling its new product, called APM, in the form of extruded shapes, forgings, sheet, foil, drawn and extruded tube, impact extrusions, fasteners and wire. Three different alloys are available. Alloy M257 is made from domestic aluminum powder, while alloys M430 and M470 are made from powder imported from Switzerland.

Claims for APM—Alcoa has been working on this project for years at its New Kensington, Pa., research laboratories. The results, now commercially available, have certain properties more advantageous than titanium or steel, says the maker. And higher thermal conductivity is claimed for APM products than for either of these two metals.

Costwise, Alcoa says APM products are more economical to use than titanium, but they cost more than stainless steel.

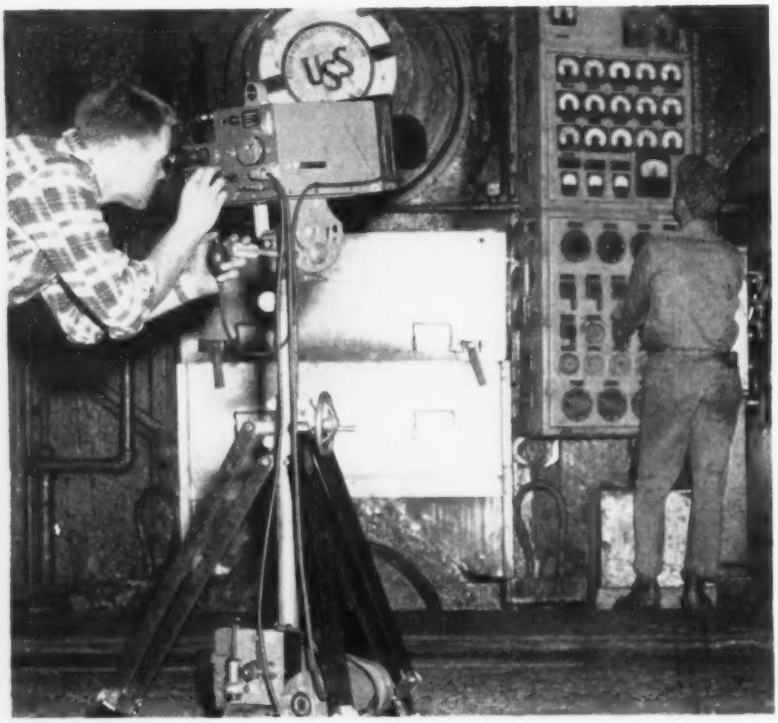
Jet Uses—One of the first applications reported for the new aluminum powder metallurgy product is for components for jet engines. Extrusions are being used for hot-air valves. A metal fabricator says he is testing the material in foil and sheet for making honeycomb sandwich structures. Fasteners are being tested by a major electric company, and tube for airborne heat exchangers.

APM products are made by subjecting fine, unalloyed aluminum powder to heat and pressure. The powder is formed into compacts which are extruded into various shapes.

Stability Secret—The secret of the stability at higher temperatures is the fact that each flake of powder is coated with aluminum oxide.

Where friction is encountered, as in engines, parts can be anodized. APM products can also be electroplated by regular methods.

Looking for Trouble



▪ The Evaporograph—a thermal-imaging camera—is now on duty as a maintenance tool at the Fairless Works of U. S. Steel Corp.

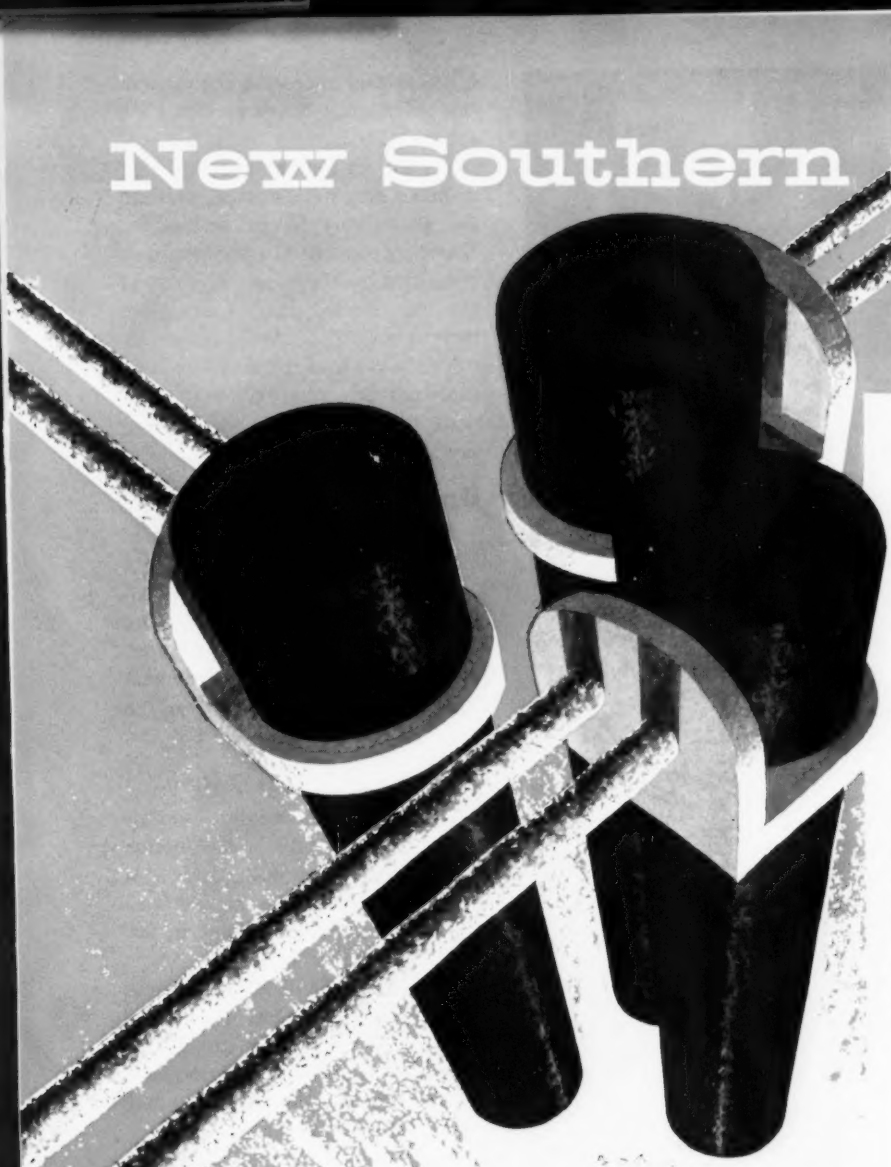
The unit, which is accurate to 1°F at distances of over 3 miles, registers temperature differences in its target area. This makes possible the detection of worn areas in equipment through heat of friction which shows up on an oil-coated membrane enclosed in the device.

For example, when focused on a roll in the cold reduction mill at Fairless (see cut) it permits study of bearing conditions.

The unit shows promise as a detector of hot-spots or worn areas in machinery, steam lines and other auxiliary mill equipment where temperature is a measure of interior conditions.

Developed by Baird-Atomic, Inc., Cambridge, Mass., the new instrument functions as efficiently in absolute darkness as in daylight, requiring no source of external illumination.

New Southern Star...



When you are on the market for billets, bars or slabs of aircraft and commercial grade alloy, stainless or forging quality carbon steels, you can't do better than order from recently revitalized Green River Steel Corporation. Born in 1953 on the banks of the Ohio River at Owensboro, Kentucky, Green River is not only the newest electric steel producer in America, it is the foremost company in its classification south of the Mason-Dixon line. Now, backed up by Jessop, its new parent organization, it offers quality and service never possible before. Ingots poured from Green River's spanking new 60-ton arc-type furnaces will continue to be processed under the exclusive Dornin patents which make Macro-clean steels of unmatched forging qualities and grain structure. But now, Green River is reaping the benefits of the years-ahead quality control methods and the excellent marketing organization of its parent Jessop. Today, more than ever before, you'll find it pays to do business with Green River—the steel industry's new Southern Star!

These Jessop district offices and representatives can now service you with Green River Products

District Offices

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Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Detroit, Mich.
Hartford, Conn.
Indianapolis, Ind.
Los Angeles, Calif.
New York, N.Y.
Philadelphia, Pa.
Pittsburgh, Pa.
Toronto, Canada
Wallaceburg, Canada
Washington, D.C.

Representatives

Charlotte, N.C.
Kansas City, Mo.
Milwaukee, Wis.
St. Louis, Mo.
Utica, N.Y.

GREEN RIVER STEEL

CORPORATION · OWENSBORO, KENTUCKY

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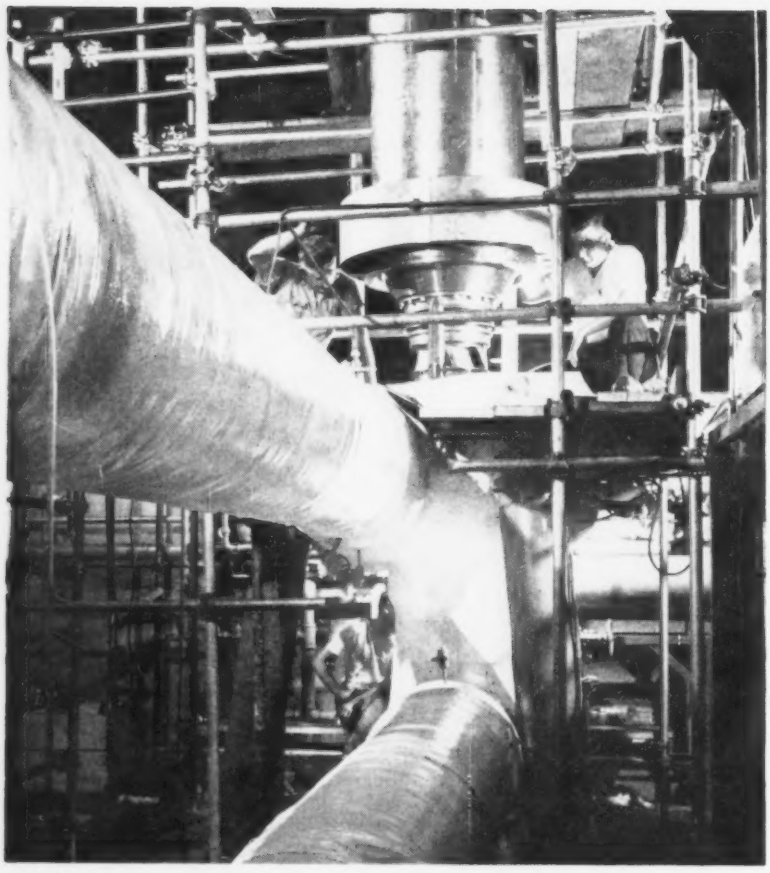


RADIOACTIVE WATER: This 18,300 gpm, 111 psi, hermetically sealed, canned motor pump is one of two which will be used to circulate radioactive water through the reactor and heat exchanger at the Shippingport Pressurized Water Reactor plant, Duquesne Light Co. Unit is being tested in a high-pressure test loop by maker, Allis-Chalmers Mfg. Co.

New House Bill Spurs Competitive Bidding

Greater use of competitive bids is the aim of a bill introduced by Chairman Vinson (D., Ga.) of the House Armed Services Committee.

Mr. Vinson is concerned chiefly with the buying of military goods under special Korean War authority (THE IRON AGE, July 4, p. 46) which allows the military to contract without certain limits prescribed by Congress. In too many cases, he says, the armed services are ignoring competitive bidding.

Proposed New Rules—The Vinson bill is designed to:

(1) Take away the President's power to declare a nation emergency that would allow the military to bypass congressional rules covering procurement.

The President would be able to declare that a crisis exists, but only Congress would be empowered to grant an emergency slackening of the military buying rules.

(2) Redefine the term "negotiation." The current law says merely that formal advertising is lacking in negotiation. New definition would demand that bidders must be dealt with openly. Exceptions would be contracts involving classified material or services, or an order where not more than $1000 is at stake.

All prices proposed would be revealed after a bidder has been accepted. Now only the successful bid is made public.

Negotiation, under terms of the Vinson bill, would refer to any buying of property or service where all bidders and the purchaser confer to work out possible uncertainties. The bill adds that after such negotiations the government buyer may still ask for sealed bids.

(3) Direct the Defense Secretary to make procurement rules uniform for all military forces. While the Secretary has issued some pertinent regulations, the Army, Navy, and the Air Force also have written their own. The separate service rules are contradictory and in some cases require entirely different practices to be followed, Mr. Vinson says.

Upward Move

Fruehauf Trailer Co. has formed a new research and development engineering department in the company's Missile Products Division. Move is designed, Fruehauf states, "to handle increasing government contract work—particularly in the guided missile field."

New Aluminum Alloy

A new aluminum alloy—developed by Aluminum Co. of America—is being rolled into plates described as having the highest mechanical properties available in the nonheat-treatable alloys.

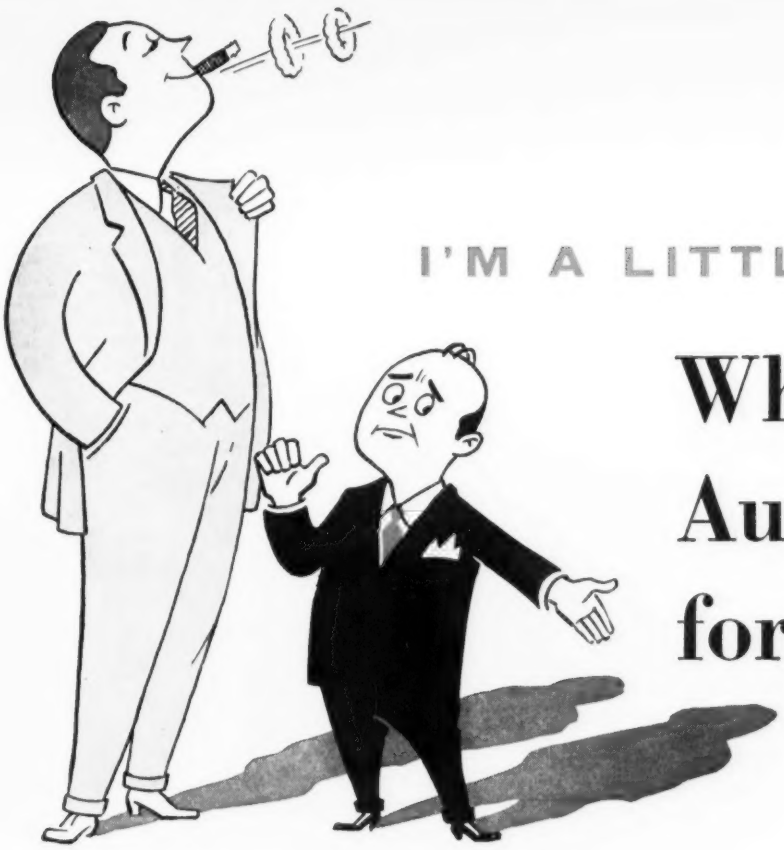
Called alloy 5456, the new composition, Alcoa states, meets the Navy's need for greater strength in aluminum plate for gun mounts, carrier elevators, deckhouses, and other shipboard installations.

Ovens for Republic

Republic Steel Corp. has awarded Koppers Co. a contract to rebuild two coke oven batteries and furnish certain chemical recovery and coke handling equipment. The new 51-oven batteries replace units built in 1918. When finished, each battery will have a capacity of carbonizing 1000 net tons of coal per day to produce 700 net tons of furnace coke daily.

Contract for Zuni

A $2 million contract for pilot production of aluminum rocket-motor tubes for the Navy's new 5-in. rocket Zuni has been awarded to the Hunter Douglas Div. of Bridgeport Brass Co., Riverside, Calif.



I'M A LITTLE GUY–

What's in Automation for me?

Depends on what you mean by automation. If you think of automation as a "push-button controlled automatic factory" the cost is probably beyond the means of the "small" manufacturer.

But if you think of it in terms of getting the most production at the least cost from the machines you have—then:

Your Bellows Field Engineer can show you ways by which, for a small investment in time and money, you can convert many of your present machines into high producing semi-automatic or automatic machines.

It doesn't matter what you make—how big or small your operation—you'll find Bellows "Controlled-Air-Power" Devices will pay for themselves quickly—often before the due date of the invoice we'll send you.

WRITE FOR THIS BOOKLET—

the quick story of what Bellows can do for you.
Address: The Bellows Co., Akron 9, Ohio, Dept. IA-757
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Only at Carlson can you buy so many grades of stainless steel in the wide variety of shapes and sizes illustrated here. We regularly process such complete bill-of-material orders. Trained Carlson men, with years of experience and practical knowledge, are determined to give you the best and most efficient service possible.

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STAINLESS STEEL PLATE . . . rolled to almost any size or thickness, 3/16" and heavier, to meet your individual needs—whether rectangles, circles or special patterns. Substantial tonnage in Types 302, 304, 304-L, 309, 309-S, 310, 316, 316-L, 317, 317-L, 321, 347, 348, 405, 410, 430 and 502-½% Mo. is available for prompt delivery. In addition, two precipitation-hardening grades, Types 17-4 PH* and 17-7 PH* are now in production.

STAINLESS STEEL HEADS . . . in Types 304, 304-L, 316 and 316-L are available from stock in ASME and Standard specifications (10" to 72" diameter). A large assortment of dies is available for pressing other types of heads and special sizes can be spun where practical.

STAINLESS STEEL FORGINGS and SPECIAL PATTERNS . . . including tube sheets, flanges, circles, rings, sketch plates and other specialties can be produced to specification on our versatile equipment.

Also STAINLESS STEEL BARS AND SHEETS (No. 1 Finish).

*Trade mark of ARMCO STEEL CORPORATION

PLATES • PLATE PRODUCTS • HEADS • RINGS • CIRCLES • FLANGES • FORGINGS • BARS and SHEETS (No. 1 Finish)

Walter H. Leo

Last of Washington's WOC Men

BDSA has chosen a Sheffield steel man as the last "without compensation" director of its Iron and Steel Div.

What Mr. Leo has learned in construction steel sales, he will put to use during his six-month term in the capital.

WALTER H. LEO: Industry has profited from the functions of BDSA.

▪ Know your product, Walter H. Leo urges men who would build a career in the sales field. Know it thoroughly, be honest with your customers, and make your calls. If you follow these principles consistently, he advises, you can sell successfully.

Mr. Leo might add that it's a great help to like what you're selling. Selling steel is an activity he has enjoyed from the start, more than 25 years ago. He has been doing the work he wanted to do in the industry he selected.

Accepts BDSA Post—Now, for a time, he can survey the steel industry from a new direction. Mr. Leo is the new director of the Iron and Steel Division, Business and Defense Services Administration, U. S. Dept. of Commerce. Under present policy, he is the last without-compensation (WOC) man from industry who will hold that position.

Sheffield Div., Armco Steel Corp., has given him a half-year of leave from his job as manager, sales, construction products. In that capacity, he has been finding customers for construction bars and reinforcing wire fabric.

"In recent years," says Mr. Leo, "there has been a complete acceptance of the need for reinforcement. The use of reinforcing steel and wire has become recognized as an important component of good concrete construction."

Started With Laclede — This wasn't always the case. Things were different when Walter Leo, fresh out of the University of Missouri in 1929, entered the steel business with Laclede Steel Co.

At that time there was no sales training program waiting for him. Instead, he went directly into the Madison, Ill., plant and began learning about steel products. Three years later, he moved to the Kansas City office of Laclede as district manager. He was there until 1941, when he joined Sheffield Steel.

Sees Agency Benefits—With his new firm, Mr. Leo went to Oklahoma City as district manager for a year. Then followed Army service from October, 1942, until July, 1945, with an assignment in G-2. Returning to Sheffield, he was sales manager, highway products.

He moved on to Dallas in 1948 and was district manager there until 1952. In that year he returned to Kansas City to manage the sales of construction products.

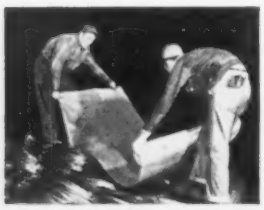
Also, in 1952, Mr. Leo became a director of the Wire Reinforcement Institute, and later president. He was also elected a director of the Concrete Reinforcing Steel Institute in 1954.

how to rustproof cold rolled steel in shipment and storage

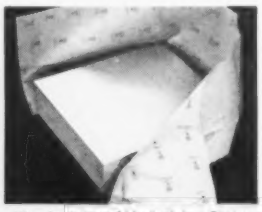
Proved by actual test! Unwrapped steel rusted within a few hours. Identical steel wrapped in Ferro-Pak showed no signs of rust . . . even after several months. Non-toxic chemical vapors from Ferro-Pak coat the steel with an invisible film that makes it impossible for rust to get the slightest foothold.

Even under adverse conditions, such as outside storing or shipping, Ferro-Pak provides complete protection. It is waterproof, strong, yet highly flexible and easy to handle. The chemical rust inhibitor is compatible with oil and stays effective for long periods even when the humidity soars.

Whether you're a shipper or a buyer of steel, it will pay you to specify Ferro-Pak wrapping wherever rust is a problem. For an interesting idea brochure on many uses for Ferro-Pak, write Cromwell Paper Company, 4803 South Whipple Street, Chicago 32, Illinois.



How to rustproof a freight car—Ferro-Pak is used to line sides of car and to interleave coils, transforming ordinary freight car into huge rustproof package.



How to rustproof black plate—On this light gauge, dry, uncoated steel, rust can start from a fingerprint. Ferro-Pak keeps black plate rust-free even when the humidity soars!

FERRO-PAK®
by Cromwell

For over 38 years—
"Paper Engineers" for Steel

There Are No Automatic Profits

In a business plateau, pressure is on management to keep alert to changing conditions.

First quarter earnings indicate many branches of metalworking are caught in a profit squeeze.

Purchasing agents' monthly forecast implies inventory cuts may be at an end.

▪ The overall business outlook for 1957 continues to look very good. Unfortunately, this may be small consolation to firms that find themselves in a tough profit squeeze, regardless of business conditions.

It's a characteristic of the so-called business plateau that it pays a premium for efficient business management. On the other hand, it guarantees no fat balance sheet to the companies that have lagged in developing and improving their products, marketing, and manufacturing efficiency.

Look at the Figures—This is one of the lessons to be learned from the earnings of corporations thus far in 1957. A few second quarter reports are coming in, but in general the pattern of the first quarter continues.

The Securities and Exchange Commission, having tabulated first quarter reports for U. S. manufacturing corporations, points out: "While overall income figures were the highest on record for any first quarter, the pattern followed by individual industries varied over a wide area with increases in a few selected industries offset by declines in others."

Problems Ahead — And while first quarter sales were 7 pct higher than the first quarter of last year, they were still 2 pct below the fourth quarter of last year.

First quarter reports show that most industry groups, 18 of 23, had increased sales over first quarter of 1956. But in terms of profits after taxes, only five groups had better showings this year than last.

The SEC report tersely understates the situation when it says this was "reflecting the effect of increased costs and the narrowing of the profit margin in many groups."

. . . Durable Goods Ease

Nondurables Boom—The financial reports continue to underscore that the durable good industries, where metalworking's markets predominate, are not doing as well as the nondurable goods industries.

This reflects the continuing trend for the buying public to pay more and more for services and luxury or pleasure items, with some reluctance to maintain the same rate of spending for the major products that are expected to last for years.

Situation Varies—But even this conclusion is misleading. Some of the industries that had less than expected sales in the first quarter of this year actually showed improved profits.

First quarter of this year was not only better than the last quarter of 1956 for motor vehicles, but it was better than a year ago. The figures for profits after taxes: first quarter 1956, $395 million; fourth quarter 1956, $378 million; first quarter, 1957, $467 million.

Steel Does Well—More surprising, possibly, is the record of the steel industry, reflecting the primary iron and steel group. You may recall the concern in the first quarter over the moderate drop in the steel ingot rate.

Profits did drop from $410 million in the last three months of 1956 to $390 in the first quarter. But in spite of the much lower rate of operations, first quarter profits this year were well over the rate of $373 million the year previously.

The big sufferers in the primary metals industries are the nonferrous metals. Profits sagged from $256 million first quarter 1956 to $176 million first quarter this year.

PA's Report

Some Spots Noted—The old reliable forecasters, the purchasing agents, are not up to their usual optimism.

The July survey of the National Association of Purchasing Agents does indicate an overall high level of business activity. But some spottiness is noted. Only 21 pct say production is up while 25 pct say it's down. Improved orders are reported by 23 pct.

Inventories Steady — There are indications that inventory reduction measures, which have been blamed for some of the recent declining level of business, are nearing an end. No change in materials on hand is indicated by 52 pct. Continued decreases are pointed to by a minority of 29 pct.

A sharp increase in number of purchasing agents who limit their MRO buying to 30 days is noted, indicating the general increased availability of materials.

AUTOMOTIVE

Ford Water Paint Aids Safety

How It's Made Is Still Top Secret

Water-emulsion paint was developed in a two-year research program.

It's non-inflammable and produces no dangerous fumes. It's competitive cost-wise and requires few equipment modifications.—By H. R. Neal.

▪ Ford auto frames move along a conveyor to receive their customary flo-coating of protective paint. Other conveyors bump along with endless cargoes of coil springs, brake pedals or other parts. They dip through paint tanks, emerge with the parts coated.

This is a conventional scene repeated in auto plants everywhere. Hundreds of thousands of metal parts must be painted every day by similar methods.

Not Inflammable — But today these parts are being painted in complete safety. These paints contain no inflammable or fume-producing thinners or solvents.

Ford Motor Co. has adopted a new water-emulsion "safety" paint for use on automotive parts. The new paint is the result of two years of research by Ford's process development department in cooperation with the company's paint suppliers.

Perhaps Ford realizes the significance of this development more than any other manufacturer. Just last winter a disastrous fire exploded in the paint area of the frame line at its giant Rouge plant. Several employees died as a result of the fire.

Important Safety Step — D. J. Davis, Ford manufacturing vice-president, called the new non-solvent paint an important milestone in the automobile industry "since it contributes significantly to safer employee working conditions."

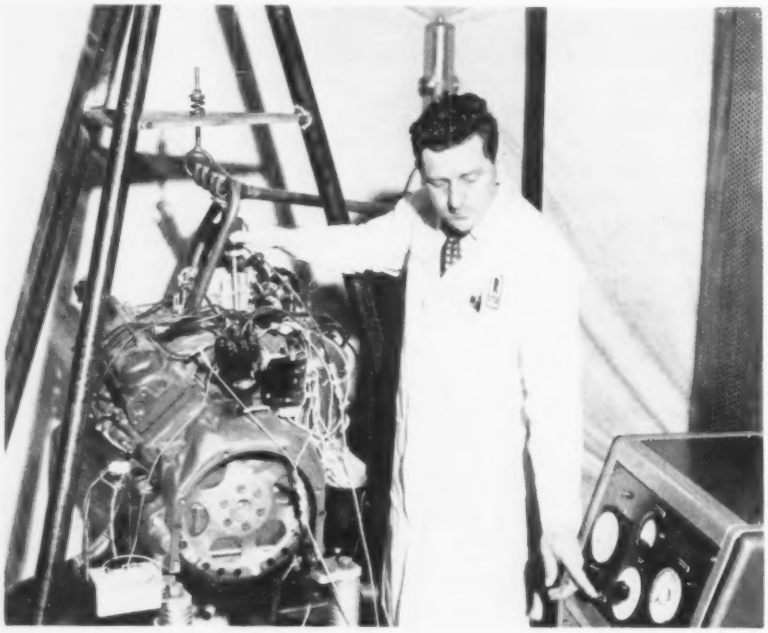
The non-solvent paint consists of particles of pigment or protective substance suspended in water rather than dissolved in a volatile thinner, such as naphtha. Since it contains no solvent, it does not emit inflammable fumes.

Major Research Needed—"While water-emulsion paints have existed for several years, extensive research was required to perfect a product with exterior durability and which was adaptable to high volume production conditions. A foaming problem was especially difficult to overcome," Mr. Davis said.

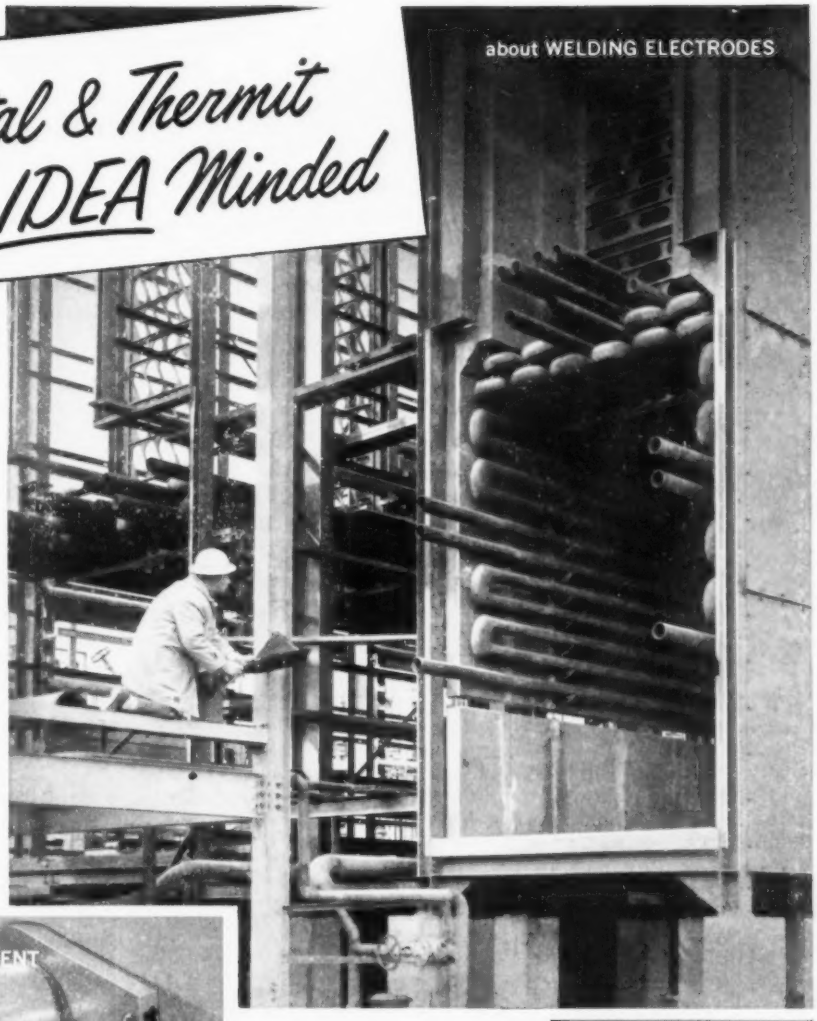
One Ford paint supplier, the Glidden Co., gives an idea of how big the problem really was. It had started working on emulsion paints 20 years ago for uses other than on metal. Other paint manufacturers are active in this field. Industrial metals presented a formidable barrier. Oil and water don't mix. Most metals used in manufacturing have a protective coating of oil or something similar.

It's a Secret—Water paints refused to adhere. They would always slide off the surface to be painted. Glidden won't say what changed all that, nor will its competitors. But all are excited over the possibilities

PSUI: Pulse synchronized unbalance indicator is all electronic device, developed by General Motors, for detecting engine unbalance to lower limits. It checks a running engine at the end of the assembly line and adjustments are made at the flywheel, or fanbelt pulley wheel.



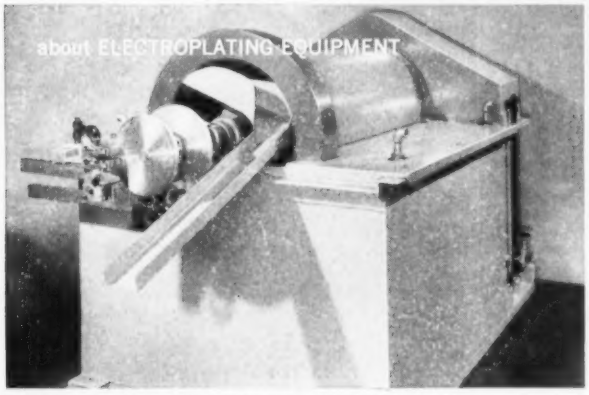
from: Metal & Thermit
to: The IDEA Minded



Welding problem solved—production increased

The Blaw-Knox Company, a leading designer and constructor of high pressure, high temperature catalytic reformers for petroleum refining uses special chrome-moly pipe to resist hydrogen attack on furnace tubes at high temperature and to provide desirable creep properties. Welding this alloy had always been difficult. Yet maximum assurance against weld-failure was essential.

Chosen for this difficult job, M&T's Murex® CROLOY electrodes make it easier to obtain high quality welds because maintenance of preheat and postheat temperatures is not critical. These Metal & Thermit electrodes, combined with Blaw-Knox designed unique welding back up equipment, increased productivity of the Blaw-Knox welding crew by a full 50%. They improved weld penetration, eliminated underbead cracking.



A barrel of savings in small parts plating

Chromium plating of small parts is no longer a costly, manhour consuming operation. The unit shown is the new *continuous* Unichrome chromium plating barrel designed by Metal & Thermit. This is a real production tool. It equals 4 batch type barrels in output; plates up to 200 pounds of parts per hour. It brings automation to companies that must chromium plate hundreds of thousands of small parts per day.

Golden-glow bronze finish wins the trophies

Arlen Trophy Company, leading manufacturer of die cast trophies, finds "gold" in the M&T *Golden-Glow* Bronze Plating Process. Cups formerly plated with copper, nickel and gold now get a beautiful-to-behold bronze finish directly on castings. It is the image of 24 kt. gold!

M&T Bronze is also being used in hundreds of installations to replace copper as an undercoat, plating intricate parts more uniformly and twice as fast. It also helps conserve costly nickel.

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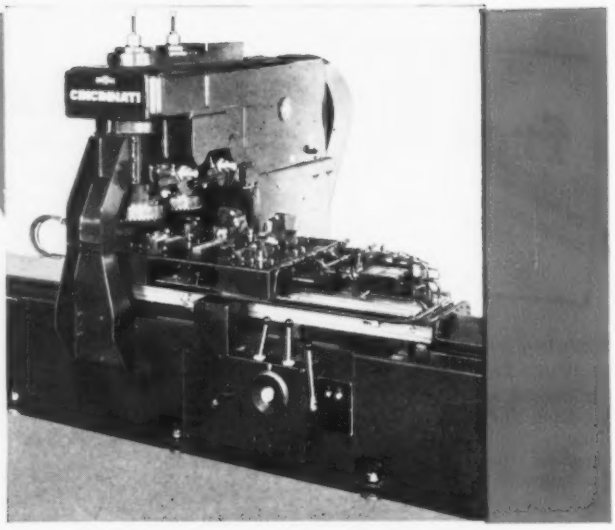


HyPowermatic with 50 hp main drive and two vertical spindles in a fixed housing, tooled up to mill the top and combustion face on cylinder heads. Many standard HyPowermatic units and features are incorporated in this machine.

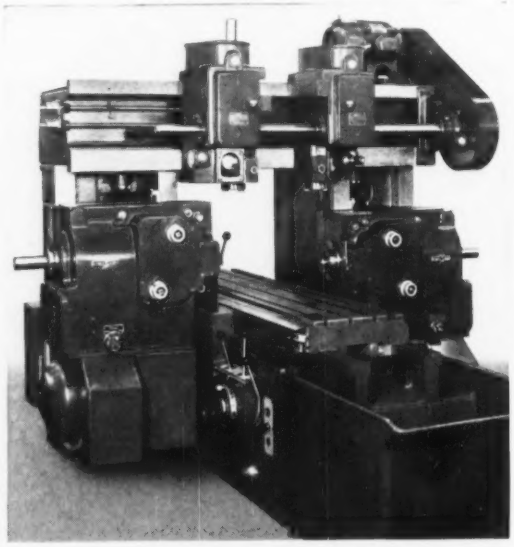
Cincinnati HyPowermatic Unit Construction Plan

Don't discard new production milling ideas as being too costly without considering Cincinnati's HyPowermatic unit construction plan. You may find that a special machine is entirely unnecessary. HyPowermatics are assembled from standard and complementary units to give you unusual combinations such as:

1) Close-coupled spindle carriers
2) Vertical and angular spindle heads; many styles and combinations, including adjustable angle
3) Ram mounted spindle heads
4) Fixed height or adjustable bridge type rail support for vertical spindle heads

Take a look at the heavy duty automatic milling machines in your shop which may have become productively obsolete. You may be surprised to see how much you can gain—in production and lower unit cost—by replacing with CINCINNATI® HyPowermatics, built up with standard and complementary units to suit the job. They offer many cost-cutting replacement possibilities. May we send you a copy of the new, fully illustrated catalog? For brief specs, look in Sweet's.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO



HyPowermatic, duplex style, equipped with highly useful complementary units consisting of two additional spindle heads mounted vertically on a cross rail. This HyPowermatic can mill simultaneously the sides and top of box-shaped parts.

CINCINNATI
Plain HyPowermatic
MILLING MACHINE
Duplex and Tracer Controlled styles available 42 sizes of each.
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MILLING MACHINES • BROACHING MACHINES • CUTTER AND TOOL GRINDERS
METAL FORMING MACHINES • HARDENING MACHINES • OPTICAL PROJECTION
PROFILE GRINDERS • CUTTING FLUID • GRINDING WHEELS

Automotive Production

WEEK ENDING	CARS	TRUCKS
July 20, 1957	118,834	22,749
July 13, 1957	111,943	22,610
July 21, 1956	113,416	21,706
July 14, 1956	112,361	21,412
TO DATE 1957	3,678,260	635,838
TO DATE 1956	3,469,971	647,836

*Estimated. Source: *Ward's Reports*

for water-emulsion paints. Glidden recently purchased new laboratory facilities to expand its research in this field.

The paint companies make some common sense claims for their new product. First of all, they point to the all-important safety factor. This is probably the most important characteristic. Then they list the potential savings possible. In full-scale production they feel the paint will be competitive with solvent paints.

Cost Factors — A reduction in material costs will result. There will be no need to buy solvents required to thin present paints. As long as a plant has water, it will have all of the solvent it needs.

Lower insurance costs will result from reduced risk of fire. A switch to water-emulsion paint would not require a great outlay for new equipment. Minor modifications to present equipment are all that would be required. The paint can be applied by any of the existing methods, dipping, flo-coat, or spraying.

One needed change, however, is in the drying setup. Emulsion paints require a preheat oven of lower temperature to prevent blistering. Abrupt exposure to the high heat of conventional ovens would turn water in the paint into steam.

Easier Ventilation—Dipping tanks require modifications to improve the flow and circulation of paint in the tanks. The paint people point out that such changes should be made anyway for present solvent paints.

Water-emulsion paints reduce the need for ventilation. Volatile fumes are not a problem. Ventilation is only required to maintain a clean atmosphere for the workers and to reduce heat build-up.

First applications of the new material were made at Ford's frame plant and standard transmission and radiator plant in Dearborn and at its Monroe, Mich., parts plant. At present only brake pedal arms, coil springs and frames receive a protective coating of the new paints.

Tested for Bodies — Humidity and exposure tests indicate that the water-emulsion paint equals the durability of previously used materials. Each particular application of industrial paint has its peculiar requirements.

Last week a new car was prime coated with water-emulsion paints. It is believed to be the first time this has been done. No special equipment was needed for the job. But until durability and quality can be evaluated, it is not likely to be adopted on a production basis. To date, auto body colors have not been produced in commercial quantities. However, pigmentation of paint is not a problem. Only metallic colors with aluminum particles in suspension are expected to present a minor obstacle.

Others Watch Closely — Other companies are taking a good look at water-emulsion paints. Chrysler Corp. is conducting laboratory experiments for cost, quality and durability. General Motors has looked at the paint. All automakers with plants on the West Coast have a keen interest in this paint. They may shortly be faced with the problem of installing burn-off towers, to destroy toxic fumes being released to the atmosphere, as a smog control measure. Paint makers say that the problem is eliminated with water-emulsion paints.

Mr. Davis of Ford summed up the work in progress: "Studies are continuing to develop more water-emulsion paints with the special characteristics needed in the various processes of quality automotive production. The outlook is extremely promising for expanding the use of water-emulsion paints to more Ford manufacturing operations."

THE BULL OF THE WOODS By J. R. Williams

WHAT DO YOU MEAN, HAVE I HAD ANY EXPERIENCE? WHY, THERE AIN'T A JOB IN THIS PLANT I COULDN'T DO WITH ONE HAND TIED BEHIND MY BACK!
WELL, WE DON'T NEED ANY HELP RIGHT NOW!
THE CARD OUTSIDE SAYS "MAN WANTED," BUT THE BULL SAYS NO MEN NEEDED! IT DON'T ADD UP, BUT IT'S EASY TO FIGURE OUT!
YEAH, IT DOESN'T TAKE TH' BULL MORE'N A COUPLE OF QUESTIONS TO FIND OUT ALL HE WANTS TO KNOW ABOUT A MAN--HE KNOWS THEY DON'T COME AS GOOD AS THIS GUY THINKS HE IS!
THE STOPPER
J.R.WILLIAMS
1957 by NEA Service, Inc. T.M. Reg. U.S. Pat. Off.

INTRODUCING GRAPH-AIR...

a tougher, more versatile graphitic tool steel that air-hardens at temperatures 200° to 300° lower with less distortion!

NO facilities for oil-quenching—or other relatively costly heat treating processes? Need a finer air-hardening tool steel? Then specify *Graph-Air,* newest steel resulting from the Timken Company's pioneering in fine alloy steels. Latest addition to our line of quality graphitic tool steels!

Graph-Air tool steel air-hardens at temperatures of 1450°F to 1550°F—200° to 300° lower than most other air-hardening tool steels. And because Graph-Air *is* air-hardened, there's less distortion, easier heat treating control, less decarburizing. As a result, Graph-Air can be made into *more intricate sections.* Graph-Air is a tough air-hardening steel, too—made to order for such demanding applications as blanking dies, or any tool steel part which must take hard abuse.

Besides all the advantages of air-hardening—economy, less drastic reactions to quenching, less tendency to scale—Graph-Air offers greater wear, machinability and stability. Like Graph-Mo, Graph-Air will outwear other tool steels, because of the uniform diamond-hard carbides in its structure. Graph-Air stays *accurate longer,* is fully as stable as other Timken Company graphitic tool steels, which are the most stable tool steels made!

Growing out of the Timken Company metallurgists' long experience with fine steel making, Graph-Air—the *new* graphitic tool steel that can be air-hardened at *low* temperatures—will be available in both solid and hollow bar sizes. For more information, write: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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Monopoly Report May Fizzle Out

But Kefauver Still Has His Hopes

Report on restraint of competition just doesn't arouse Senate's fighting mood.

Kefauver will have trouble keeping interest alive unless he finds something hot politically.—By G. H. Baker.

▪ The renewed Senate drive against bigness in business and industry may yet result in some tough new new antimerger laws. But the campaign led this year by Senator Kefauver, D., Tenn., has thus far failed to strike any effective sparks.

For the past 18 months, Sen. Kefauver's subcommittee on antitrust and monopoly matters has been busily compiling over 500 printed pages of tables calculated to show that competition is fading in many U. S. industries.

No Sex Appeal—But the report has thus far failed to capture the imaginations of other senators, with the result that it may well serve no useful purpose except to provide statistical reading for professors of economics. It frankly lacks political sex appeal. Unless Mr. Kefauver and some of his colleagues can breathe life into its dry pages, it is not likely to generate any new laws.

Mr. Kefauver is aware of this shortcoming, and he has started to campaign in the Senate for additional money to keep the investigation going. Let's at least carry it over into next year, he asks. There's a need for "continued effort" to keep the statistics on monopoly trends up to date, he declares.

Still Competition—You can expect to hear much talk from Mr. Kefauver about declining competition in such industries as automobiles, dairies, baking, and leather. But you won't hear much about metal fabricators (more firms in nearly all categories today than in 1947), machine tool builders (more than twice as many today as in 1947) and electrical equipment.

Senator O'Mahoney, D., Wyo., a member of the Kefauver subcommittee, believes the new report may provide him with the opportunity to dust off his 25-year-old "federal charter" bill. Under this plan, all corporations would have to apply to a federal commission for charters or licenses to do business. The licenses would be revoked and the firms out of business at the pleasure of the commission.

Forces Trimmed

The cutback in military troop strength won't effect military buying, nor is it deep enough to result in any overall lessening of national defense.

Congressmen of both political parties generally are endorsing the reduction in enlisted manpower by Defense Secretary Wilson.

Mr. Wilson is planning to cut back enlisted strength in the Army, Navy, Air Force, and Marine Corps by 100,000 men.

In addition, he plans to cut back officer strength by 20,000.

The effect of the Wilson order is to trim total uniformed personnel from about 2.8 million to about 2.7 million by January 1.

Hoover Plans Move Slowly

Rough Going—Businessmen and others attempting to win government adoption of the Hoover Commission's recommendations for reforms in the federal bureaucracy face a tough, uphill fight.

Depending on whose accounting is used, something around 40 pct of the original recommendations have been adopted either in whole or in part. But they were the noncontroversial, and generally less important suggestions.

Pentagon Resists—The Defense Dept. is one of the toughest nuts for the Hoover Commission supporters to crack. Among the major objectives of the Commission were:

To get the Pentagon out of unnecessary competition with private industry; to improve and simplify the Department's organization framework; to integrate common supply and service activities among the military services; to increase the tenure in office, moral, and skill of both civilian and military employees, and to establish clear financial control throughout the Defense Department.

Won't Centralize — One of the most controversial recommendations as far as the military is concerned is the establishment of a central supply and service agency in the Department to handle purchasing, inventory control and distribution for common articles.

The Pentagon has not gone along entirely with the recommendation, but is attempting to broaden its so-called single manager plan, under which one service has the full management of a given common supply and service activity, such as food or medical supplies.

3 WAYS YOU CAN KEEP AHEAD OF COMPETITION

A BETTER PRODUCT . . . AT LESS COST . . . through ADVANCED GAGING!

Profit margins aren't getting any better . . . just the opposite. It's no longer a matter of "getting the stuff out". The problem now is making it *better at lower cost.* Advanced gaging—by FEDERAL—can do it. The gaging ideas are proven profit makers. The gages, far from being monsters of automation, are compact, standardized units, realistically designed to provide automatic control or inspection, or both, where it does the most good and at a price that almost *every* manufacturer can afford. And they have reliability . . . the most important single feature of FEDERAL Gaging.

Whether you're big or small in terms of production, *at least one of these gaging arrangements can pay off for you.* It's the truth. Ask us to prove it. Write:

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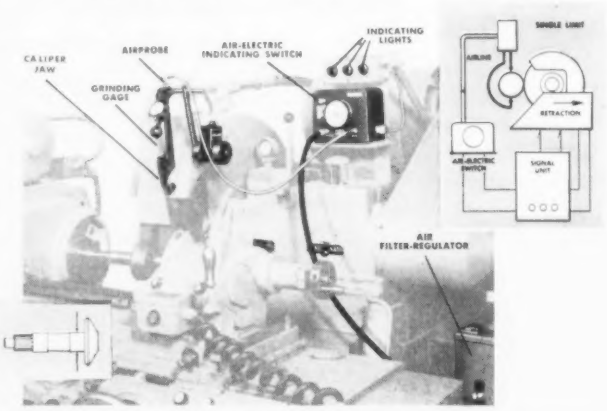
① AUTOMATIC CONTROL OF FINISH SIZE

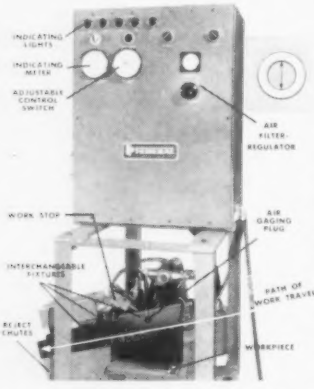
This standardized control gage continuously measures and indicates size of work as it is being ground and automatically causes wheel to retract the instant finish size is reached. Unit can be easily applied in the field to any center type grinder having hydraulically controlled wheel slide.

BENEFITS: Reduces costs — one operator handles two, possibly three grinders performing the same or different operations. Gages pay for themselves within a few months.

Improves quality — even if you have only one grinder, gage is a profit-maker because it eliminates error due to operator inattention or fatigue and also eliminates cost of later inspection.

VARIATIONS: Similar FEDERAL Gages are available through machine tool manufacturers to change wheel feed rate to dwell grind also . . . or to control dressing cycle and finish size on I.D. grinders. When specifying machine tool requirements be sure to include Federal gaging.



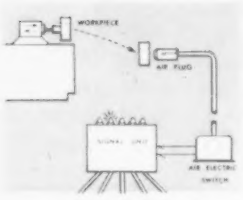


② AUTOMATIC 100% INSPECTION

This standardized "post-process" gage inspects every part as it is discharged from the machine and sorts work into "good", "*near*-over", "*near*-under" plus "salvage" and "scrap", indicating the size of each piece. Operator can compensate for drift and piece-to-piece variation *before any scrap parts are produced.* Can be applied to any type I.D. or O.D. grinder, lathe, boring machine or screw machine.

BENEFITS: Lower cost per part. Virtually eliminates scrap by showing trend *before* tolerance limits are reached.

Eliminates inspection errors — gage has 99.8% reliability or better.



VARIATIONS: Federal Gages of similar type are available through machine tool manufacturers to also provide automatic compensation of the machine, either proportionally or by increments, so that drift is corrected without need for operator attention. Be sure to specify Federal Gaging when buying machine tools.

③ SEMI-AUTOMATIC, MULTIPLE DIMENSION MEASUREMENT

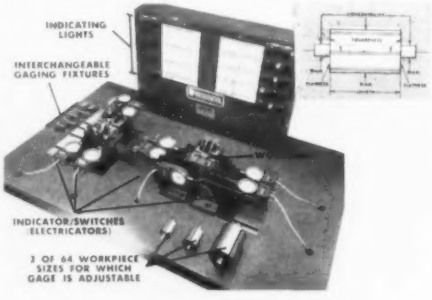
Ideal for small and medium production manufacturers, this gage checks nine dimensions in two stations and is adjustable for 64 sizes! Work is loaded and disposed of manually. Lights show "good", "over" and "under".

BENEFITS: Reduces non-productive costs—inspection time per part is reduced 75%.

Improves quality level. Permits profitable 100% inspection.

Inspection can be performed by less skilled personnel.

VARIATIONS: Can be designed to provide virtually any combination of dimensional measurements. Unit can incorporate semi-automatic disposal. Other design possibilities up to a completely automated inspection and control gage.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Missile's End Means Layoffs

Plane Cutbacks Also Bring Job Losses

Cancellation of the Navaho guided missile contract results in employment drop of 15,600 at North American Aviation.

However, many workers will probably go to work on other missile projects.—By R. R. Kay.

▪ Cancellation of a guided missile contract and cutbacks in plane production have cost some 24,000 southern California workers their jobs. And it's only the beginning.

North American Aviation is dropping 15,600 employees from its four Los Angeles-area plants. Another 8400 who work for subcontractors are out of luck, too.

Navaho To Blame—The bulk of the layoff—18,000 missile workers—follows the Air Force's cancellation of North American's Navaho intercontinental guided missile contract. Over one-half billion dollars and ten years work are in the Navaho.

The aircraft industry is braced for the Pentagon to cut back plane production. In fact, 5600 of North American's dismissals are in aircraft.

But the real shocker about this contract cancellation is that it's in missiles. Latest word from top Air Force brass had it that missile spending is in for spectacular hikes. (See THE IRON AGE, "Will Guided Missiles Blast Aircraft Industry's Plan"? May 30, 1957, p. 51.)

Building the Snark—Now, what happens to the big number of laid-off workers? Some of them will find the welcome mat out nearby at Northrop Aircraft's personnel office. This company just got a $73 million production order for the Snark, a high subsonic long-range intercontinental missile. And it looks as if more Snark orders are on the way. Lockheed Aircraft, too, expects to take on 5000 more missile workers "within the next year."

The Navaho was North American's only prime contract in missiles. As it looks now, the company is out of the picture for the present. The firm employed 69,000 people around the country—51,000 of them in the Los Angeles area where it was concentrated.

Here's a rundown of the missile-making picture at the major West Coast aircraft plants:

Convair: Atlas intercontinental ballistic missile and Terrier surface-to-air missile. Also Tartar research and development project.

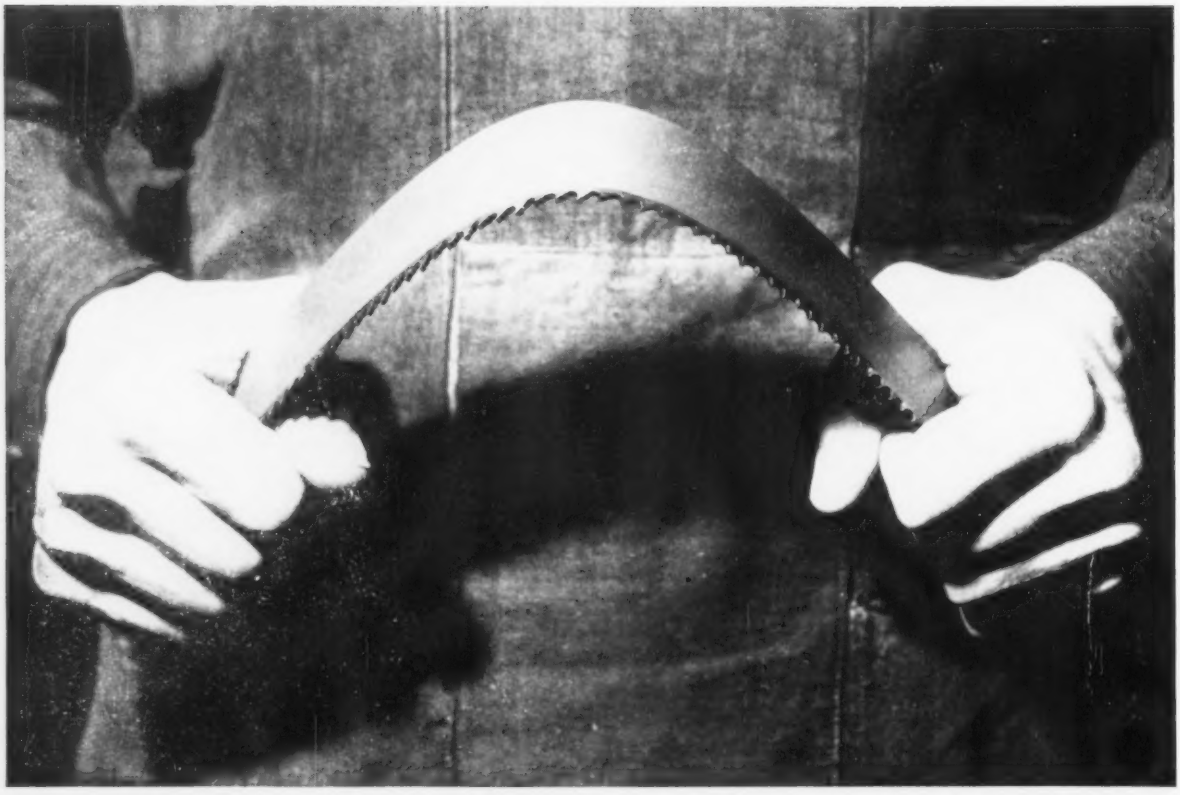
Douglas: Nike-Hercules ground-to-air missile, Honest John ground-to-ground ballistic missile, Sparrow air-to-air missile, and Thor intermediate-range ballistic missile.

Lockheed: Polaris intermediate range missile, X-7 ramjet test vehicle, and X-17 ballistic missile.

Northrop: Snark. Also the Crossbow project.

Boeing: Bomarc anti-aircraft guided missile.

FIRST OF THE LATEST: The initial aft fuselage section for Boeing's 707 Jet stratoliner airliner is being shipped to that firm's Seattle plant by the unit's builder, Ryan Aeronautical Co., San Diego.



THIS is No Ordinary Power Hack Saw Blade

This is the *unbreakable* MARVEL High-Speed-Edge Hack Saw Blade—the first bi-metal blade—invented, developed and introduced by MARVEL. This blade is a combination of two materials best suited to the requirements of an efficient hack saw blade . . . a narrow high speed steel cutting edge permanently welded to a tough, non-brittle alloy steel body. Each blade is triple tempered to assure long life and maximum toughness to the cutting edge. Development of this high-speed-edge blade made it possible to cut any kind of material from the free machining steels to the toughest of alloys, fast, accurately and economically. Just one type blade to handle any job — no switching blades to cut different materials. Like all good things, attempted copies of this blade have been numerous, but its performance has been *unequalled* by any of the imitators.

The MARVEL high-speed-edge hack saw blade can be tensioned from 200% to 300% tauter than any ordinary hack saw blade, a definite advantage which permits heavier feed pressures to be used without deflection or fear of breakage.

An extremely rugged cutting tool, this one type blade, the MARVEL High-Speed-Edge Hack Saw Blade, will cut any machineable metal with outstanding economy, accuracy, long life and complete safety—*it is unbreakable.*

Ask for MARVEL Blades by name and you can be sure you're getting the best on the market. Leading Industrial Distributors have them in stock.

B-1120

Write for latest cutting tool Bulletin and the name of your nearest MARVEL Distributor

MARVEL Metal Cutting SAWS

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How to Speed Up Die Changes

Use Complete New Setups to Cut Downtime

Press builders are now adapting a trick long used in die tryout work.

Some new units permit fast shifts with complete die setups already mounted on bolster plates.—By E. J. Egan, Jr.

■ Time out for die changing is big poison to production schedules in plants that stamp a variety of large parts. The antidote bottle has been on the shelf for years. The only trouble is, somebody put the wrong label on it and sent it to the die tryout department.

If you have to make a lot of die changes, what could be simpler than getting whole new setups ready on extra bolster plates? Then, as soon as you finish a run on one die set, slide it—with its bolster—out of one side of the press and move your new setup right in behind it.

Ready for the Big Time—This trick has been used in die tryout and spotting work for a long time. But there have been relatively few cases where production stampers have used it on big presses.

Now, it seems that the idea is going to bust loose all over stampingdom. The picture, painted by press builders such as Danly Machine Specialties, Inc., looks like this: entire lines of spare-bolster presses, for what you might call the near-ultimate in flexible automation.

At least one mass-production stamper was quick to get the picture. SIMCA, the European auto maker, will blend some of Danly's new quick-die change units into two complete press lines.

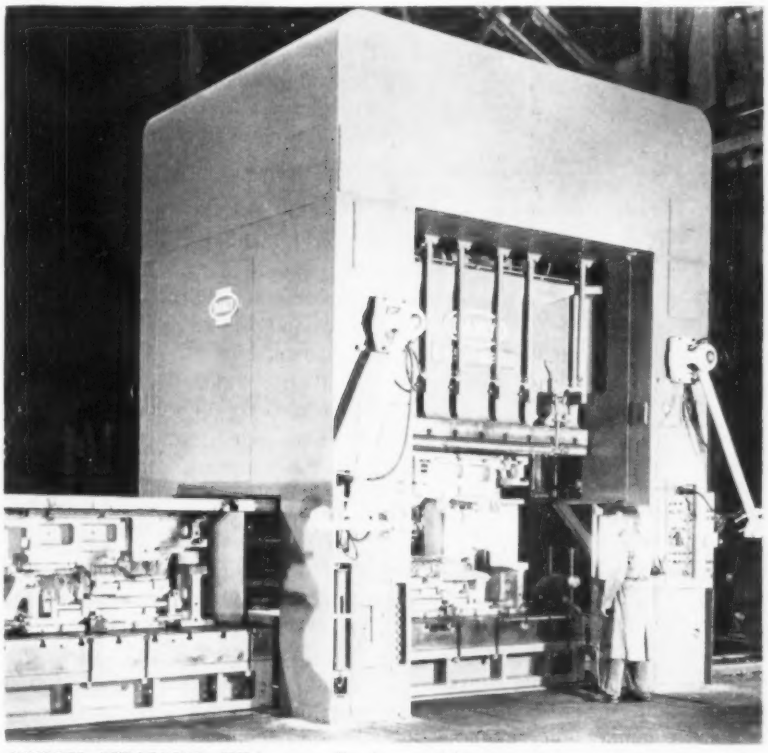
Speeds Die Changes—What will the customer gain? Some of the benefits were pointed out when Danly unveiled a couple of the SIMCA quick-change units last week in Chicago.

Most of the potential advantages stem from one fact: changes on big dies that formerly took hours—maybe an entire shift—can now be made in 30 minutes. This means that high-speed underdrive or overdrive presses can now pack plenty of economy for short as well as long-run production.

In turn, this short-run efficiency leads to better inventory and production control; banks of stamped parts don't have to be sky high simply because a long run is the only way to justify the time and cost of a die change.

Relieves Breakdown Headaches—Having a spare die set all ready to go on an extra bolster is handy in another way, too. In case the die in the press breaks down, you merely push a button and slide it out from under. Push another button, slide the new tools into place and you're off and stamping.

Other press builders are also well into the same quick-change act. Clearing and Verson, to name a couple, have spare-bolster units in operation. Hamilton Div. of Baldwin-Lima-Hamilton Corp. is also developing a unit.



QUICK CHANGE: With one die in working position and a second installed on a die carrier outside the press, it's clear why this 500-ton Danly unit only requires 30 minutes for a complete die change operation.

INDUSTRIAL BRIEFS

Scrap Yearbook Out—The 1957 edition of the Institute of Scrap Iron & Steel Yearbook is now available. Standard statistical tables showing consumption of scrap, shipments, and prices are listed. The Yearbook contains specifications for scrap, the Institute's bylaws, officers, directors, committee personnel, and an alphabetical listing of members.

RETIRING: Charles Halcomb, deputy director, Iron & Steel Div. of the Commerce Dept's Business & Defense Services Administration, will retire August 30.

Heavyweight Expansion — The Illinois Gear & Machine Co. is spending $2 million in expansion at its South Works in Chicago. Building construction doubles the size of its heavy manufacturing division. More than half of the expenditure is represented by heavy machine tools. Parking areas are being enlarged.

All Shook Up — Dravo Corp., Pittsburgh, will manufacture and install Schenck-designed vibrating conveyors and screens for Armco Steel's sintering plant at Ashland, Ky. Installation includes three single mass, free oscillating conveyors and a single mass, free oscillating screen to handle sinter material at temperatures up to 1400 degrees F. Equipment is designed to handle 2500 tons of hot sinter per day.

A Bargain—Gardner-Denver Co. has purchased the plant of the Camfield Mfg. Co., Grand Haven, Mich. Involved in the transfer is a building containing 68,000 sq ft manufacturing space. Included are 47,000 sq ft of manufacturing space plus office facilities, a locker room, laboratory and an adjacent storage building. Indicated purchase price was near $160,000.

Quiz Program—U. S. Steel Corp. has published a pamphlet entitled "Science in Steelmaking." One aspect offers quiz material for the secondary school classroom covering the science of steelmaking from raw materials to finished products. This booklet is designed to stimulate interest in science studies and scientific careers.

Optical Illusion—The Spectron Div. of Consolidated Electrodynamics Corp. has purchased the optical production and testing equipment of Testa Mfg. Co., El Monte, Calif. Testa has discontinued its optics division, but will continue the production of custom-built optical instruments, and microscopes for laboratory and school use.

Prep School — Chrysler Corp. will build a training center in Skokie, Ill. Purpose is to train sales and service personnel from its dealerships in 17 midwestern and southern states. Completion is scheduled for February, 1958. The training activities will be directed by the company's training center headquarters in Detroit.

Working Room — Bethlehem Steel Co. will build an engineering office building for its Pottstown Works' Fabricated Steel Construction Div. Drafting operations, administration, engineering, and billing functions will now be together in one building. Ground-breaking ceremonies will take place this month. Completion of the facility is planned for the end of 1957.

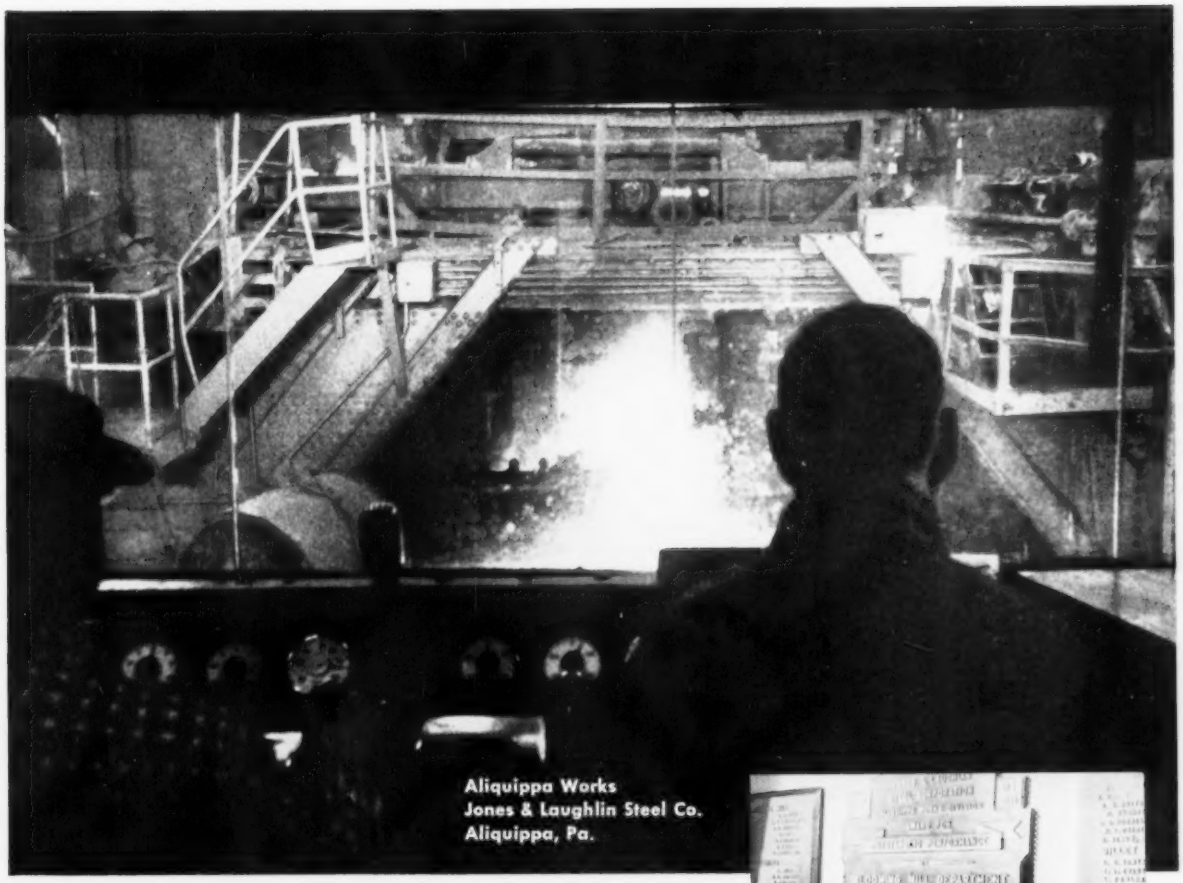
Strengthening Atlas — Convair-Astronautics will begin moving into its new $40 million Atlas ICBM plant near San Diego. Complete occupancy is expected by January. Moving plans have been coordinated with construction progress to minimize loss of work on the Atlas intercontinental ballistic missile, which is in pilot production at the San Diego plant of Convair Div. of General Dynamics Corp.

Chain Reaction—The American Chain & Cable Co. is now occupying a new office and warehouse building in Los Angeles. The new structure is the second of a group of four being built. This construction program comprises several structures to house some 40 new industries and will represent a total investment of about $38 million when completed.

Draining All Canada — Armco Drainage & Metal Products, Inc., has announced construction of the 55th in a chain of fabricating plants which spans the U. S. and Canada. It will be located at Sackville, New Brunswick, and will be Armco Drainage's eighth Canadian installation. The plant will serve New Brunswick, Nova Scotia, and Prince Edward Island. The $150,000 unit will manufacture corrugated metal drainage pipe in a wide variety of sizes.

Open the Valves—Minneapolis-Honeywell Regulator Co. has opened a facility in Fort Washington, Pa. The new $1.5 million plant will produce industrial valves for automation and the nation's missile program.

Ready for More—Eastern Stainless Steel Corp. is in the final stages of its $8 million plant expansion program. Included is a Sendzimir cold rolling mill and extensive supporting equipment. Also, a new 30-ton electric arc furnace with an annual capacity of 30,000 tons. The company has arranged an additional $5 million loan with six banks to aid in financing, when necessary, its anticipated future increase in production and sales.



Aliquippa Works
Jones & Laughlin Steel Co.
Aliquippa, Pa.

An ingot a minute!

and never a lubrication failure with Cities Service EP-21 Lubricant!

At Jones & Laughlin's Aliquippa Blooming Mill, they believe in production with a capital "P"!

Not only does J&L's Aliquippa Mill hold the world's record for ingots rolled in an eight hour turn (576), but they've set a year-in, year-out average of an ingot per minute!

How do they sustain this production for such long periods?

One answer lies in their modern, 44-inch, two-high reversing unit, powered by four 3000 h. p. motors arranged in tandem twin drive.

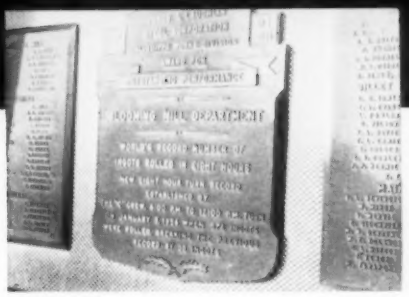
Another can be found in their lubricant . . . Cities Service EP-21.

Used on main bearings, manipulator slides and window liners, Cities Service EP-21 and its superior additives provide an unusually tough film . . . tough enough to stand the highest pressures, the greatest shock loads with no loss of lubrication, no danger of rust or corrosion.

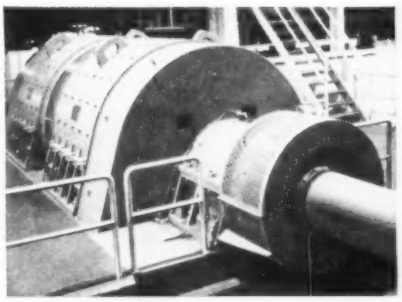
Yes, Jones & Laughlin is pleased with Cities Service lubricants! You'll feel the same when Cities Service goes to work in your operation. Talk with your Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

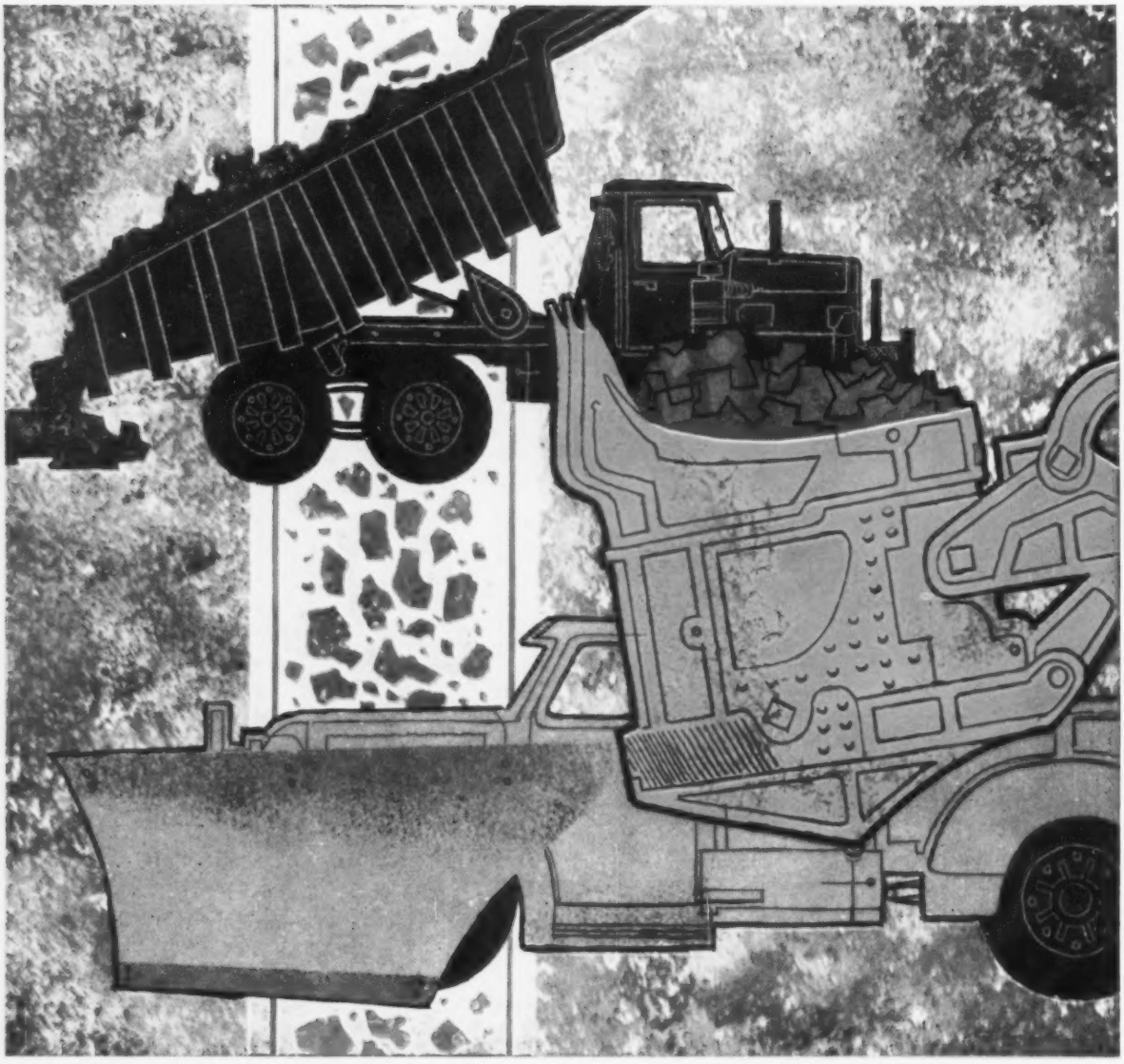
QUALITY PETROLEUM PRODUCTS



Award for 8-Hour Turn Record is displayed proudly outside mill. J&L smashed previous record by 38 ingots—rolled up new total of 576! Year-in and year-out, the plant averages an ingot a minute, with flawless lubrication provided by Cities Service.



Four 3000 h.p. Motors power the blooming mill at J&L's Aliquippa Works. These are 70 to 140 rpm, double-armature units arranged in tandem twin drive. At 70 rpm, they can reverse in under a second. Equally flexible is the mill's lubricant—Cities Service EP-21.



JALLOY special alloy steel

resists impact and abrasion in toughest applications

Heat treated Jalloy steels wear as much as 20 times longer than mild steels under rigorous impact and abrasive conditions. By using Jalloy you can cut maintenance costs drastically. Increased product life reduces downtime and lowers your labor costs.

Jalloy steels are available in the forms you require (plates, hot rolled sheets, hot rolled bars, small shapes and structurals). Jalloy can be purchased in three grades to meet specific use requirements: Grade 1, where formability is important; Grade 3, capable of being heat treated to excellent physical properties for good resistance to abrasion or wear; Grade 7, where high hardness with good ductility or wear resistance is desirable.

Your local distributor can supply you with latest information on these Jalloy grades, or you can write to Jones & Laughlin Steel Corporation, Dept. 403, 3 Gateway Center, Pittsburgh 30, Pa.

J&L STEEL

Jones & Laughlin

...a great name in steel

W. A. Cook, elected president, Phoenix Iron & Steel Co.

N. L. Whitecotton, elected commercial vice president, General Electric Co., Philadelphia.

A. R. MacNeil, named vice president, MacDermid Inc., Waterbury, Conn.

J. K. Louden, named vice president, director and chief executive officer, Lebanon Steel Foundry.

J. A. Ackley, elected vice president and **A. W. Holeywell,** elected secretary, Pyrofax Gas Corp., unit of Union Carbide Corp.

L. F. Hickernell, appointed vice president, engineering, Anaconda Wire & Cable Co.; **L. L. Carter,** named chief engineer; **H. V. Van Valkenburg,** promoted to general sales manager.

W. C. Leingang, named general manager, Stokes Molded Products Div., Trenton, N. J., The Electric Storage Battery Co., Philadelphia.

Douglas Joyce, appointed vice president, operations, Algoma Steel Corp., Ltd., Sault Ste. Marie, Ont.; **Carson Weeks,** appointed vice president, sales.

M. B. Byron, elected vice president and director, The Edward W. Robotham Co., Hartford, Conn.

F. L. Goldsby, appointed asst. to the president, Chicago Bridge & Iron Co., Chicago; **S. C. Hamilton,** named vice president and general sales manager; **K. W. Lange,** appointed Houston district sales manager.

W. R. Todd, named president, Sponge Products Div., The B. F. Goodrich Co.

H. L. Spaunburg Jr., appointed manufacturing manager, and **J. J. Jones,** appointed sales manager, Contract Sales Div., Hartford Special Machinery Co., Hartford, Conn.

E. H. Eggers, appointed district manager, Cambridge, Mass., office, Vulcan Crucible Steel Div., H. K. Porter Co., Inc.

W. R. Hough, W. H. Haber, and **H. D. Luke,** elected vice presidents, operations, groups, Reliance Electric & Engineering Co., Cleveland; **R. A. Geuder,** elected vice president, marketing.

Roland Whitehurst, elected president, Jessall Plastics Inc., Kensington, Conn.

R. M. Kearns, named manager, Engineering & Planning Dept., Alloy Tube Div., The Carpenter Steel Co., Union, N. J.; **Barclay Morrison,** appointed manager, Product Engineering & Development Dept.

M. G. Smith, named general manager, Exide Industrial Div., The Electric Storage Battery Co., Philadelphia.

D. L. Sponseller, named superintendent, Maintenance Dept., Hamilton, O., plant, Armco Steel Corp.; **J. P. Johnston,** appointed

combustion engineer, Middletown Works' Engineering Dept.

R. G. Allen, elected vice president, Bucyrus-Erie Co., S. Milwaukee.

D. T. French joins the Elliman Steel Co., Detroit, as vice president.

R. G. Ellis, named staff assistant to vice president and asst. general manager, Micromatic Hone Corp., Detroit.

George Bennethum, appointed asst. manager, alloy steel sales, The Carpenter Steel Co., Reading, Pa.; **T. A. Washburn,** named asst. manager, tool steel sales.

E. G. Counselman, appointed manager, industrial sales, H. K. Porter Co., Inc., New York; **W. E. Haines,** named Washington representative.

T. G. Granryd, appointed manager, Product Improvement Dept., The Frank G. Hough Co., Libertyville, Ill.

J. N. Hart, named controller, B. F. Goodrich Co., Akron, O.; **G. H. Sengpiel,** named director, employee relations.

David Duff, appointed manager, product engineering, Everett-Lynn Foundries, General Electric Co.'s Foundry Dept.

I. K. Knight, appointed general sales manager, Ottawa Steel Div., L. A. Young Spring & Wire Corp., Ottawa, Kans.

P. B. Zeigler, appointed chief engineer, Saginaw Steering Gear Div., General Motors Corp.; **C. W. Lincoln,** appointed technical asst. to the general manager.

W. K. Baird, appointed district traffic manager, Youngstown and Warren steel districts, Republic Steel Corp.

K. H. Baessler, appointed director, wire product development, Colorado, Wickwire Spencer, and Pacific Coast Divisions, The Colorado Fuel & Iron Corp.

Dr. N. D. Greene and **Dr. Wallace Sheely,** named asst. research metallurgists, Metals Research Laboratories, Electro Metallurgical Co., Niagara Falls, N. Y.

F. W. Ingold, named sales manager, Cincinnati steel service plant, Joseph T. Ryerson & Son, Inc.

M. D. Ott, promoted to division accountant, Wire Rope Div., Jones

& Laughlin Steel Corp., Muncy, Pa.; **J. P. Jones,** promoted to division accountant, Electricweld Tube Div., Oil City, Pa.

Michael Toth, appointed manger, Turbocharger sales, De Laval Steam Turbine Co., Trenton, N. J.

Dr. A. C. Ruge, named director, research and development, Electronics & Instrumentation Div., Waltham, Mass., Baldwin-Lima-Hamilton Corp.

OBITUARIES

W. C. Kerrigan, 64, asst. to the president, The International Nickel Co. of Canada, Ltd. and The International Nickel Co., Inc.

Kershaw Harms, 58, vice president, American Smelting & Refining Co.

C. L. Lancaster, 53, vice president and manager, Bumper Div., Electric Auto-Lite Co., Sharonville, O.

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IRIDITE® FINISHES

for

CORROSION-RESISTANCE, PAINT BASE on ALUMINUM and MAGNESIUM

TYPICAL APPLICATIONS

Aircraft and Missile Parts

Automobile Hardware

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Marine Equipment

EASE OF USE—Iridite is a simple chromate conversion treatment. Fast, easy, economical. You just dip, brush or spray it on the part at room temperature. No special equipment. No specially trained personnel.

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LOWEST COST—You have only minimum equipment cost, no special racks, high speed operation, lower overall handling costs.

CHOICE OF APPEARANCE—Clear coatings that retain metallic lustre to dark, maximum protection coatings. A variety of colors is available by dyeing.

IRIDITE #14 and #14-2 (Al-Coat) for ALUMINUM

Two specially formulated finishes that give you maximum latitude in aluminum treatment. Both provide excellent corrosion protection and paint base. Iridite #14-2 is an improved product that allows greater flexibility in operation and coating thickness and produces the optimum in corrosion protection.
Either coating provides corrosion resistance superior even to complicated electrolytic treatments in a fraction of the time. These coatings also offer many other valuable characteristics: they have low electrical resistance, they aid in arc-welding, provide a good base for bonding compounds, have no effect on the dimensional stability of close-tolerance parts. Final appearances ranging from clear through yellow iridescence to full brown can be obtained. By dyeing, you can produce red, green, blue, orange or yellow finishes.

IRIDITE #15 for MAGNESIUM

Produces a protective, paint base film with corrosion resistance at least equal to that obtained from long, high-temperature dichromate treatments in a fraction of the time and at room temperature. The appearance of the coating can be varied from light brown to dark brown and black.

APPROVED UNDER GOVERNMENT AND INDUSTRIAL SPECIFICATIONS

SEE FOR YOURSELF WHAT IRIDITE CAN DO . . . SEND SAMPLE PARTS FOR FREE PROCESSING. Look at the results, test the protection, evaluate the savings. Also write for handy Reference File of the most complete data published on chromate conversion coatings. Or, for immediate information, call your Allied Field Engineer. He's listed under "Plating Supplies" in your classified phone book.

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West Coast Licensee—L. H. Butcher Co.

New Weld Method Joins Spaced Metal Sheets

Here's a welding technique that doesn't require metal-to-metal contact between sheets in order to join them.

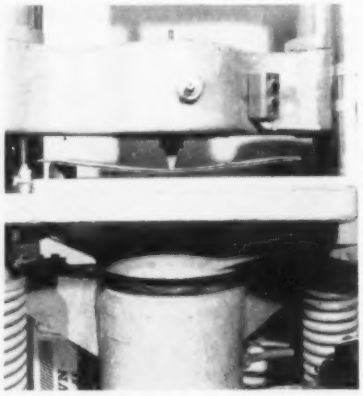
It fuses to ⅛-in. sheets with gaps twice the bottom's size.

■ A new welding method joins spaced metal sheets with thicknesses up to ⅛ in. and gaps or spaces up to twice the thickness of the bottom sheet. It's a development of Linde Co., Div. of Union Carbide Corp.

Called space-welding, this method may prove to be an economical substitute for other methods of obtaining spaced sheet construction, particularly for heat exchange applications. It requires minimum material preparation and uses standard Sigma spot-welding equipment. It can be used effectively on any material that can be Sigma welded, with the possible exception af aluminum.

High Rigidity—Resultant assemblies produced by space-welding have high rigidity. For example, a pressure of 412 lb was required to produce a ½-in. deflection on a sample space-welded assembly of 1/16-in. carbon steel sheets as compared to 212 lb for the same deflection on a single sheet ⅛-in. thick.

Space-welding is different from projection or plug welding. It does not require metal-to-metal contact between sheets, or specially prepared sheets with prefabricated projections or holes for plugged material.



Here's a testing machine trys—and proves—weld rigidity.

The new method uses a delayed wire feed with standard Sigma spot-welding equipment and argon shielding gas. The arc melts a hole through the top sheet and fuses the molten material to the lower sheet.

Fuses Easily—A column of metal

Hendrick Manufacturing Company, pioneer perforator, can really help designers improve product appearance and salability SOLD. No matter what the material you're using... be it metal, masonite, rubber, plastic, or insulated board, Hendrick's wide experience and manufacturing facilities can be of real help. You can select from hundreds of attractive designs in commercially rolled metals and gauges in round, square, diamond, hexagonal, or slotted, square, round, perforation in plain or Panel effects.

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Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring — Shur-Site Treads • Armorgrids • Hydro Dehazers • Petrochemical Column Internals

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 141. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

builds up until it fills the hole and fuses with the top sheet. Using this method, it is possible to obtain a larger fused area in the lower plate with no preparation of material to be welded other than the insertion of removable spacers between the two plates.

Laboratory tests have shown that in some cases, space-welding requires only single cycle Sigma spot welds. Others, particularly as the spacing increases, require double cycle Sigma spot welds.

The nuggets or spacers which are developed between the sheets are controlled and uniform, indicating that good fusion is obtained on the lower plate. However, some cold lap may occur. By making an additional spot weld through the lower plate from the opposite side, most of the cold-lap area can be eliminated.

Bonds Soft Metals To Semiconductors

A new technique for bonding leads to semiconductor devices has been achieved at Bell Telephone Laboratories.

"Thermo-compression" provides a bond that is stronger than the lead itself. Temperatures and pressures required are not high enough to affect the electrical properties of the semiconductor material.

Works In Seconds—One method of forming a suitable bond employs a heated element such as a wedge, a flat or a point, to press the metal against the heated semiconductor. Pressure is sufficient to cause a slight deformation of the lead. Adhesion occurs within a matter of seconds.

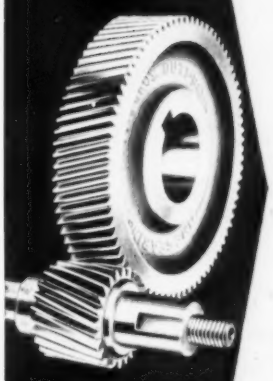
Another useful connection may be made by butting the headed end of a wire against the heated semiconductor by means of a capillary tube.

No Chemicals—The technique is readily adaptable to mass production and no chemical flux or other chemical contaminant is involved. Leads may be attached to very small areas, an invaluable aid in

PREMIUM GEARING
at Production-Run Prices

Foote Bros. Offers Engineered Helical and Worm Gear Sets FROM STOCK

1638 Duti-Rated COMBINATIONS



IN STOCK:

*Horsepower Ratings....1 to 200**
*Center Distances.....2" to 12"**

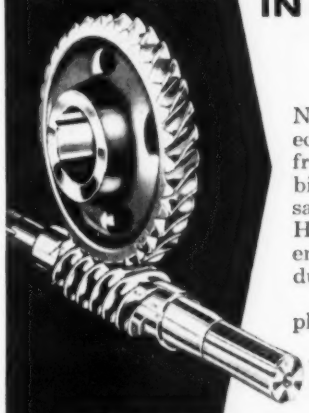
Check with Foote Bros. *before* you finalize that design. The chances are you'll find exactly what you need among the 1638 *stock* combinations of Duti-Rated Helical Gears.

When you buy Duti-Rated Gearing, you'll get more than best for your money . . . you'll get the benefit of thousands of engineering and development hours . . . and the unquestioned advantages of precision tooling and manufacturing methods. You'll get performance proven in countless Foote Bros. Line-O-Power and special drives, and Foote Bros. —Louis Allis Gearmotors. This is high hardness, accurate, balanced design gearing that will give you more load capacity and wear life per dollar.

**Larger sizes made to order from standard tooling.*

Write for DUTI-RATED catalog: Engineering Manual DR No. 2.

150 WORM GEAR COMBINATIONS



IN STOCK:

Horsepower Ratings....1 to 100†
Center Distances.....2" to 12"†

Need worm gear and worm sets? There is economy and convenience in choosing them from the many Foote Bros. worm gear combinations available from stock. This is the same gearing used in famous Foote Bros. HYGRADE Enclosed Worm Gear Drives . . . engineered, premium quality gearing at production-run prices.

Engineering Manual SW No. 1 has complete details. Write for your copy.

† Tooling available for larger worm gear sets, engineered, but not stocked, to 200 HP and 18" centers. Prompt deliveries.

ENGINEERING SERVICE

Let us help you select standard helical or worm gearing to meet your special requirements, or, let us design and build your complete unit. Place your gear problems in the hands of experienced power transmission and gear engineers. Your inquiry is invited, and there's no obligation.

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this trademark stands for the finest industrial gearing made

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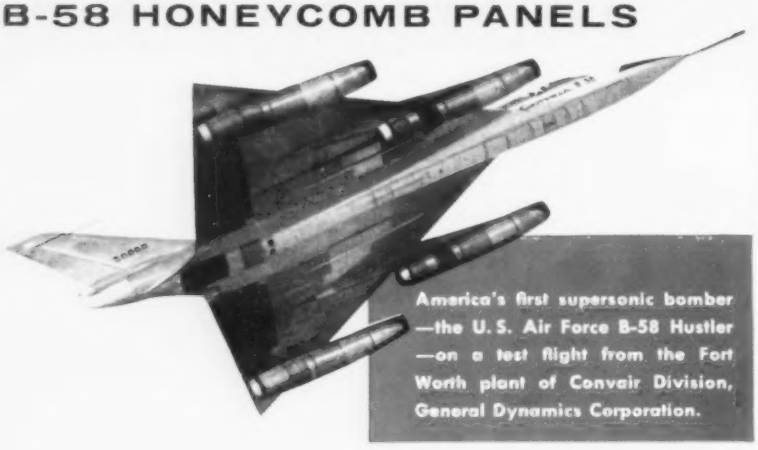
CONVAIR FURNACE-BRAZES B-58 HONEYCOMB PANELS



America's first supersonic bomber —the U. S. Air Force B-58 Hustler —on a test flight from the Fort Worth plant of Convair Division, General Dynamics Corporation.

When a bomber is designed for supersonic speeds as well as altitudes above 50,000 feet the combination of weight and strength becomes vitally important.

That's why Convair uses honeycomb "sandwich" construction for wing and fuselage panels. In producing these panels, honeycomb sections are placed in frames, faced with a silver-manganese alloy brazing foil, and then covered with skins. (Honeycombs, end closures, frames and skins are all of stainless steel.)

Assemblies are then loaded into a large alloy retort mounted on a furnace car and then travel through a brazing furnace installation designed and built by Holcroft. The result is a complete bond of all stainless steel parts.

Many manufacturers are taking a tip from the aircraft industry and are applying honeycomb construction to their own products. And more and more of these manufacturers are turning to Holcroft—not only for help in developing brazing systems but for all heat treating answers as well. You can, too. Just write.

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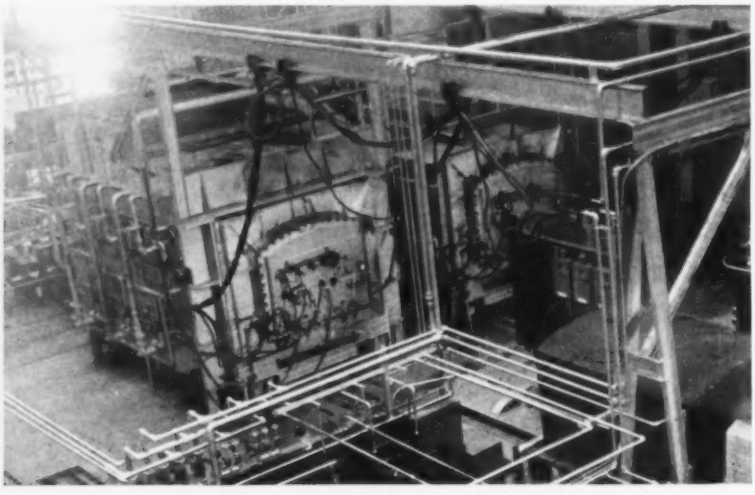
PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

CHICAGO, ILL. • CLEVELAND, OHIO • HARTFORD, CONN. • HOUSTON, TEXAS • PHILA., PA.

CANADA: Walker Metal Products, Ltd., Windsor, Ontario



fabricating high-frequency transistors.

Adhesion takes place in seconds with pressures of a few thousand psi and temperatures well below the melting point of the alloy of the metal and semiconductor.

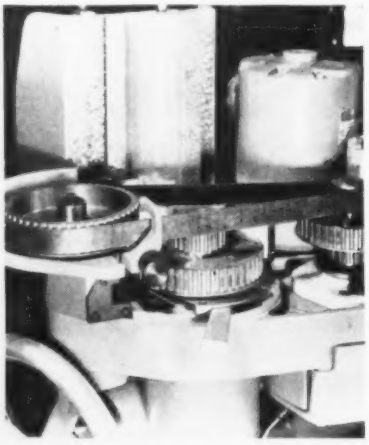
Gold Bonds Easily — A gold-germanium bond appears to be the easiest to make, but gold, silver, aluminum and a number of alloys can be readily bonded to either germanium or silicon.

The technique is already being employed on a laboratory basis in the fabrication of transistors.

Belt Drives With No Slip

A flexible transmission belt with teeth helps make possible a production tool that shapes intricate cams to a tolerance finer than a human hair. It's done by machining at precise speeds from 48 to 11,500 rpm without vibration or slip.

The machine is the Electronic Template and Cam Machine designed by the New England Ma-



This toothed belt assures precise 48 to 11,500 rpm speeds.

chine & Tool Co., and distributed by Pratt & Whitney Co.

A key feature of the unit is a Gilmer "timing" belt produced by New York Belting & Packing Co. This belt, made from rubber, fabric and steel, has teeth and turns in

grooved pulleys to give non-slip power transmission.

Wide Speed Base — The electronic cam machine guides from a drawing, using a spark-gap tracer disc to follow lines drawn with electrically conductive "ink." Since the machine is used with large and small cutters, its spindle speed is adjusted to handle the particular problem. The "timing" transmission belt makes this broad, accurate speed range possible.

According to Pratt & Whitney, the "timing" belt gives positive drive and vibrationless operation of the spindle through an exceptionally wide range of spindle speeds.

Develops Ti Alloy

A new titanium alloy possesses high strength at room and elevated temperatures. So reports Rem-Cru Titanium, Inc., Midland, Pa. The alloy has a nominal composition of 6½-pct aluminum and 3¾-pct molybdenum.

New Plating Method Rustproofs Steel

The problem of rust forming on chrome plated steel surfaces of such items as automotive trim, household appliances, etc., may be a thing of the past. Laboratory tests of a new plating process developed by Wagner Bros. Inc. are now being checked in a series of field tests now being conducted by an independent research organization.

The lab tests involved exposing a number of steel parts, plated by the new method, to a 20 pct salt spray bath at 100°C for a 192-hour period. No visible evidence of rusting, blistering, cracking or peeling whatsoever occurred. Under identical test conditions, parts plated by other methods showed considerable evidence of one or more of these blemishes after only 48 hours exposure.

Plating Sequence—Basically, the new method involves the use of a zinc base plate in the copper-nickel-

weldments
as you want
them...
For half a century, Kirk & Blum skilled craftsmen have been saving time and money for outstanding manufacturers. Whatever the weldment required, these experienced artisans know the most efficient technique to do the job accurately and quickly.
This know-how, plus modern Kirk & Blum equipment, assures high quality sheet steel and alloy fabrication.
Fabrication of guards, tanks, machine bases . . . all types of semi-finished and finished weldments . . . are available from Kirk & Blum to your exact needs.
Let K & B bring your drawings to life. Write for booklet, or send your prints for prompt quotation.
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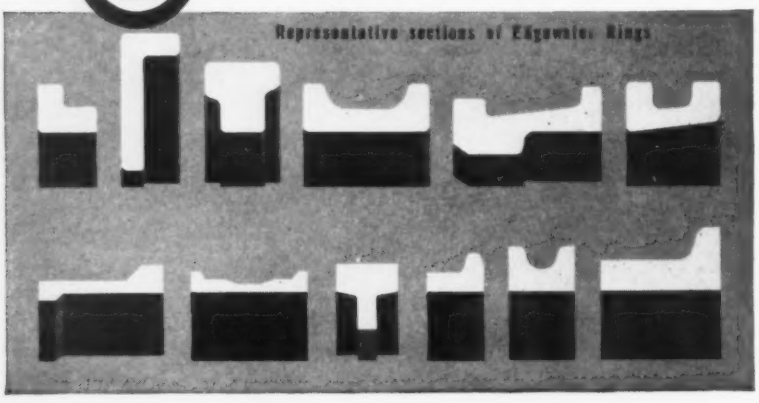
KIRK & BLUM
SHEET & PLATE FABRICATION

accurately formed
WELDED or WELDLESS
Edgewater Rings

save critical materials . . .
reduce costly machining . . .
meet highest quality standards

Your most critical specifications can be met by Edgewater Steel Rings—welded or weldless as required by the service. Formed accurately by modern methods, they are close to finish size as rolled. Weldless rings are rolled from solid steel blocks, in diameters from 5 to 145 inches. Welded rings up to 48 inches in diameter are formed from bars extruded or rolled to shape. Both types can be made in a great variety of sizes and cross-section shapes, as shown below. Being accurate in size and cross-section, Edgewater Rings save costly material and machining time.

Edgewater Steel Company
P. O. Box 478 • Pittsburgh 30, Penna.



chrome plating sequence. The zinc base-plate principle has been common knowledge, but has not been applied to the copper-nickel-chrome sequence, due to the affinity between zinc and copper.

This affinity results in the molecular "blending" of the zinc and copper layers. It creates a gap between the surface of the part and the plating metals.

The new plating process apparently prohibits the molecular blending of the zinc and copper plating layers. It prevents the formation of any sub-surface gap, and eliminates the possibility of surface cracks and peeling.

Fork Truck Puts Order In Scrap Yard

Derelicts of the Open Road get fast, careful, and efficient service at Alpine Auto Parts, Grand Rapids. Old wrecked cars no longer are dragged about this scrap yard. A new International 300 Utility tractor, equipped with a rear-mounted fork lift, was recently put on the job.

Fork trucks make dragging of scrap autos a thing of the past.

One man with the tractor easily and quickly lifts junk cars completely off the ground, transports, and stacks them about the yard—a job that formerly required at least one tow truck, two men, and considerable time.

This handy 42-hp tractor provides a number of services normally not available around most junk yards. Because the tractor and hoist lift carry cars, instead of towing them, wheels and tires can be removed for immediate sale as soon as the cars are received at Alpine.

Doubles Capacity—The International 300 Utility and fork lift, with a maximum lift height of 10½ feet, is used also to stack cars on top of each other. Stacking has doubled the yard's capacity without the use of additional ground area.

By orderly arranging and stacking, the Alpine people can pick up or pull out any particular car body in a matter of minutes.

Check-Out Big Engines In Minutes

Evaluation tests on modern high compression engines that once took 100 hours running time. They can now be done in a few minutes.

A new application of radioactive materials in lube oil does the trick for research engineers at The Cooper-Bessemer Corp., builders of large gas, diesel and gas-diesel engines.

Days And Days — In concentrated research programs involving the development of large engines, several runs of 100 hours are normally required to evaluate such factors as the effect of speed and temperature on lube oil consumption.

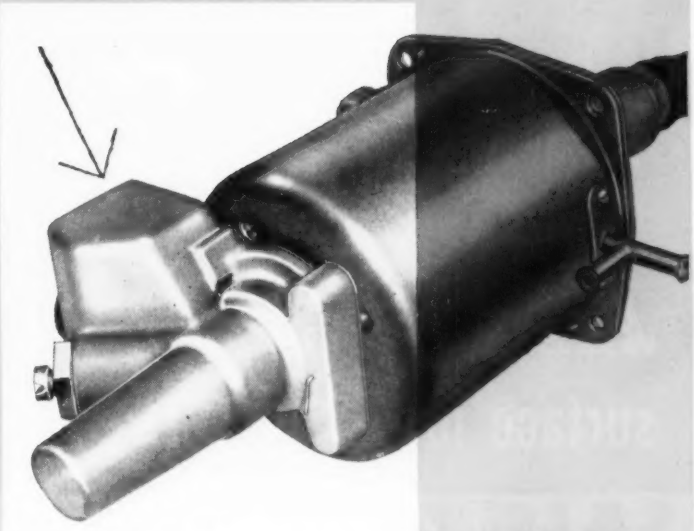
Very often the cost in terms of fuel and manpower could limit a key research program.

Dig Deep — Cooper-Bessemer's research with radioactive lube oil probes into such important questions as at what point do piston rings actually seat. The answer is vital in pipeline compressor stations where engines are overhauled and re-ringed.

In such cases, operators are inclined to put engines on full load before rings are seated. Now, manufacturers can recommend with reasonable certainty when engines can be loaded fully without undue dan-

Zincilate

when ordinary protective coatings won't do!



Zincilate #611 meets all requirements of Spec. MIL-P-26915 (USAF)

In producing power boosters for master brake cylinders, ordinary protective coatings just won't do. If the coating is applied *before* the part is machined and fabricated, it breaks down during processing and there's no more protection. If it's applied *after* processing, then there's the tedious, costly job of masking off the uncoated areas on each piece. Another problem—every power booster must be immersed in diacetone to check for leakage—and the ordinary coating simply disappears upon contact with diacetone.

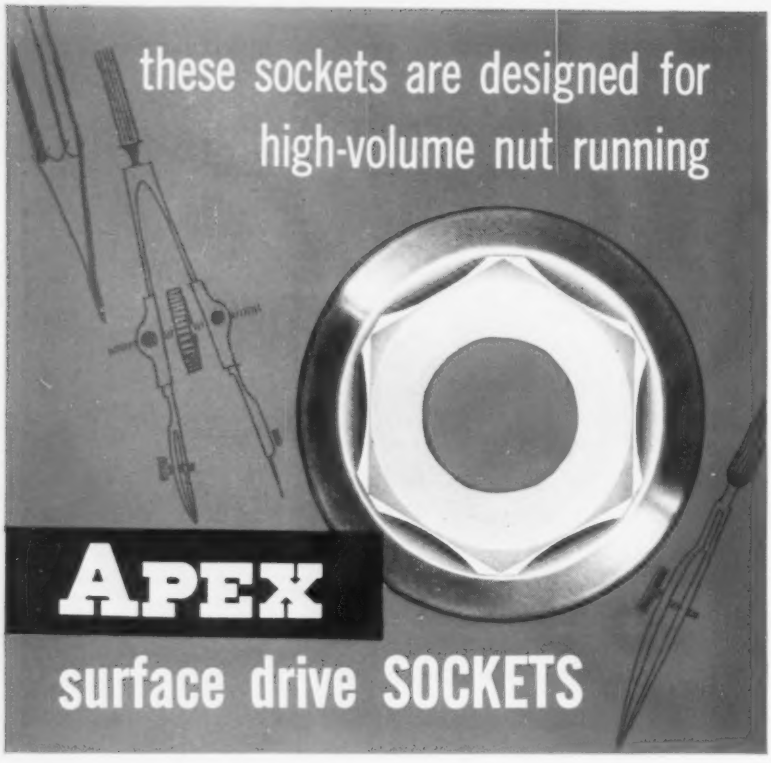
These are the kind of problems that require an outstanding protective coating—Zincilate. A quick whisk of a spray gun and each power booster is now coated—before machining and fabricating—with Zincilate #611 (one of several Zincilate formulations). There's no time wasted in masking off, and no amount of processing, even including clamping in a vise, will break down Zincilate's lasting, thorough protection. And about that testing for leakage—not even diacetone can pry Zincilate #611 loose!

When results, not mere first cost alone, are paramount, designers and producers of the finest metal products turn to Zincilate for the solution to protective coating problems. If you'd like more information on Zincilate, just outline your problem, on your company letterhead please, and we'll tell you frankly just what Zincilate can do for you.

Zincilate

CORROSION-RESISTANT, ABRASION-RESISTANT, WELDABLE, AIR-DRIED and BAKED PROTECTIVE COATINGS

INDUSTRIAL METAL PROTECTIVES, INC., 402 HOMESTEAD AVE., DAYTON 8, OHIO



The large opening at each corner of the hex is the reason why an Apex surface drive socket gets right on the nut, bolt or cap screw. The hex broached opening of the socket matches up perfectly with the hex head of the fastener almost instantly upon contact.

That's why Apex surface drive sockets will help you increase productive output on any high-volume nut running job. You'll keep costs down, too, because the socket drives against the center of the hex flats of the fastener, preventing damage.

you can get APEX surface drive SOCKETS in these types and sizes:

SQUARE DRIVE	LENGTHS	BROACHED OPENINGS
1/4"	Standard Long Extra Long	3/8" through 5/8"
9/32"	Standard Long Extra Long	3/8" through 5/8"
3/8"	Short Standard (thin or standard wall) Long Extra Long	3/8" through 7/8" 3/8" through 1-1/16"
1/2"	Standard (thin or standard wall) Long Extra Long (thin or standard wall)	3/8" through 1-1/16"
5/8"	Standard Extra Long (thin or standard wall)	7/16" through 1-1/16"
3/4"	Standard Extra Long (thin or standard wall)	1/2" through 1-1/16"

Catalog 129—Write, on your company letterhead please, for your copy.

APEX

THE APEX MACHINE & TOOL COMPANY
1029 S. Patterson Blvd. • Dayton 2, Ohio

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PHILADELPHIA • PITTSBURGH • PROVIDENCE • ROCKFORD • ST. LOUIS • SEATTLE
SHREVEPORT • SOUTH BEND • SYRACUSE • WICHITA

ger of scoring or premature wear to rings and cylinder liners.

Check Exhaust—Basic standards of radioactivity in the lube oil tell how much oil is by-passing the piston rings by instrumenting the exhaust. It then becomes a simple matter to determine instantly what takes place within the cylinder walls as it happens.

Fastener Recess Holds Driver Tightly

A new slotted recess permits tighter tightening and easier removal of fasteners without driver slippage and resulting damage to work. It's offered by Standard Pressed Steel Co. on its complete line of 100-degree, flush-head aircraft fasteners.

The recess, called Hi-Torque, permits safe application of high installation torques needed to preload fasteners with high tensile strengths.

Many Benefits—Features of the recess—patented by the Pheoll Mfg. Co. and made by SPS under a licensing agreement—includes: (1) increased reuseability of fasteners,

Shown with two slip-proof slot bolts is a special driver.

(2) easy driver insertion and removal, (3) positive locking of driver in recess, (4) maximum bearing surface between recess and driving tool.

Six sizes of special drivers fit all

bolt diameters from No. 10 through one inch. They're supplied by SPS with built-in adapters for all standard power drivers. The driving member of the tool is a circular steel insert. It can be rotated as the driver wears, replaced when the driver wears out.

Not Full Span—The recess is a curved slot cut across one diameter of the head. The slot—which does not quite span the head—is deepest at the center and of zero depth at the ends. In cross section it is an arc of a circle. Slot sides fan out slightly at either end for easy insertion and removal of the driving tool.

The sides of the slot are undercut five degrees from the vertical. This prevents the driver from camming out of the recess even in cases of high tightening torque or angular misalignment between driving tool and bolt head.

The Hi-Torque recess—available on all SPS steel and titanium 100-degree flush-head fasteners as well as other types—is covered by National Aircraft Standards 583 through 590 and NAS 1503 through 1510.

How To Put Out Fires

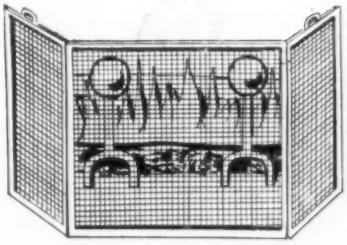
Results of a survey of the current state of knowledge of the physico-chemical means by which flames are extinguished are contained in a report of Air Force-sponsored research. It's available to industry through the Office of Technical Services, U. S. Department of Commerce.

The report is based on pertinent scientific literature up to May 1956 as well as on visits to laboratories and investigators active in research on flames. The topics discussed include methods of flame-extinguishment, uninhibited and inhibited gaseous flames, the action of inhibitors, and the burning of liquids of solids.

Attention is devoted to flames of hydrocarbons, magnesium, carbon, and rocket-propellant chemicals. The bibliography contains 345 references.

in making fine textiles

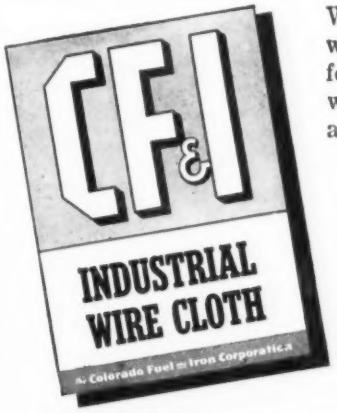
or preventing fires



you'll find...

CF&I INDUSTRIAL WIRE CLOTH

Versatility is another name for CF&I Industrial Wire Cloth. A special tinned version of it is used to gather lint in the manufacture of fine textiles. Another type is used to confine troublesome sparks to the safety of the fireplace. And chances are that you're using—or could be using—it to good advantage in your operation.



Why not get complete details on the wide variety of weaves, meshes and ferrous and non-ferrous metals in which CF&I Industrial Wire Cloth is available? Write today for Catalog.

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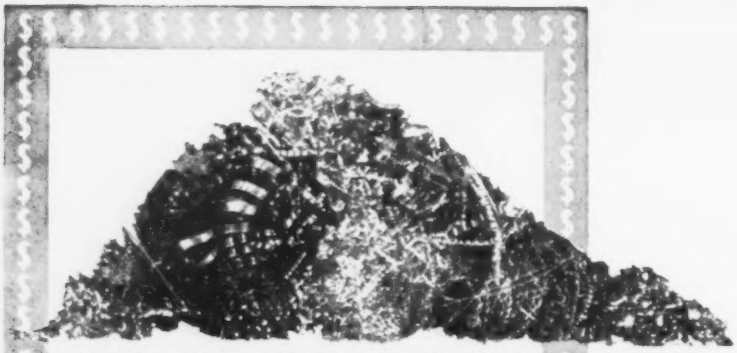


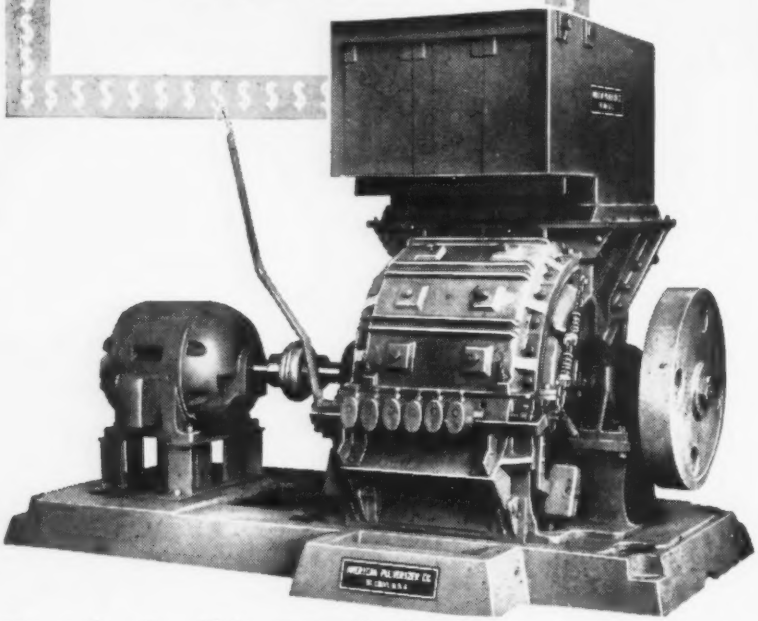
THERE ARE EXTRA DOLLARS IN THIS SCRAP PILE!

...when you install an

American

METAL TURNINGS

CRUSHER



Pays for itself in 3 Profitable Ways:

1. **TOP SCRAP VALUE.** Uniform short shoveling turnings produced by an American bring up to $4 per ton more than regular machine shop turnings.
2. **INCREASED CUTTING OIL RECOVERY.** Up to 50 gallons per ton are released from turnings reduced in an American.
3. **EASIER HANDLING, STORAGE.** American-reduced turnings require but a fraction of the usual storage space .. are easily briquetted.

Available in 1 to 10 tons per hour capacities to meet your needs. WRITE today for the complete American profit story.

American

PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1439 MACKLIND AVE. • ST. LOUIS 10, MO.

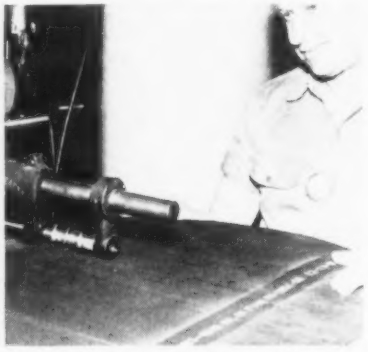
Pinking Machine Cuts Sponge Rubber

A cutting method similar to that employed by shoemakers is stripping sheets of sponge rubber down to size at The Martin Co. This cutting operation, which has increased

Old cutting methods were slow and tedious . . .

production output by 87 pct, utilizes a machine which pinks, or cuts, the sheet material into straight-edged strips of uniform thickness and size.

When performed by hand and without the aid of the pinking machine, this same operation requires a longer period for setting up and actual cutting. The former method required a razor blade, metal cutting edge, clamps, and a measuring instrument.



. . . but the new way cuts sponge rubber rapidly, with ease.

To improve the method, Martin adapted the pinking machine to the cutting operation. The lengthy set-up time, the ragged edges, and the irregular-cut sizes were virtually eliminated. As an added advantage, "gang cutting" was made possible, thus allowing several strips of rubber to be cut in one slicing operation.

Cut Out Dust, Fumes Let In Light

A new fabric keeps working areas free of dust and contaminating fumes, but allows penetration of natural light. Herculite Protective Fabrics, Belleville, N. J., developed the material.

It's a double lamination of tough vinyl plastic over a mesh of Fortisan

Workers enter and leave the plastic area via a zipper door.

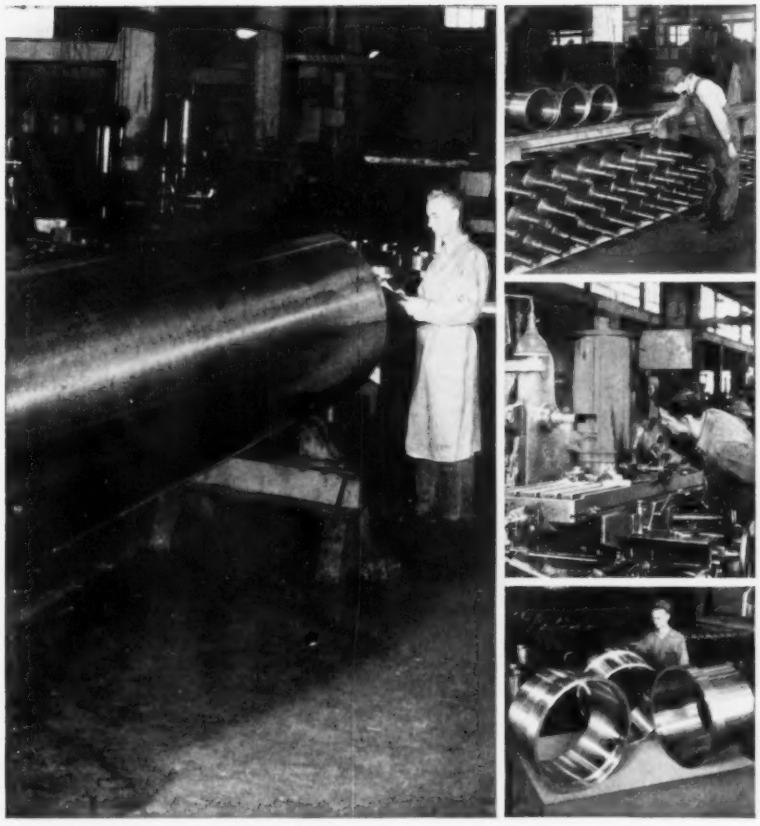
36, called Herculite F36 Clear. This tough acid-resistant fabric allows natural light to flood a working area, reducing the need for artificial light.

Long Lasting—Non-porous Herculite F36 Clear has great tear strength.

It is waterproof, fire resistant, rot and mildew proof.

Due to its lightness in weight an enclosed area of this fabric is easily set up or taken down. A minimum of storage space is needed when not in use.

The United States Navy em-



You'll find them better for pressure if they're

SHENANGO CENTRIFUGAL CASTINGS

WHATEVER the inside or outside pressures, Shenango centrifugal castings are better able to withstand them without failure.

Parts cast by the Shenango centrifugal process are much tougher because their finer, *pressure-dense* grain avoids stress concentrations while providing greater strength, better elongation and freedom from such costly defects as sand inclusions, blowholes and such.

Whether you need rings, rolls, sleeves, liners, bushings, bearings, mandrels or *any* annular or symmetrical part . . . ferrous or non-ferrous . . . in whatever shape, size or dimension to meet your requirements . . . Shenango can do the job. And do the job *better!*

For informative bulletins on the answers to your tough problems, it will pay you to write now to: *Centrifugally Cast Products Division,* The Shenango Furnace Company, Dover, O.

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to aid in

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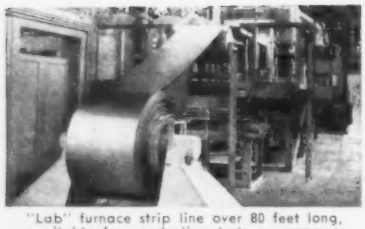
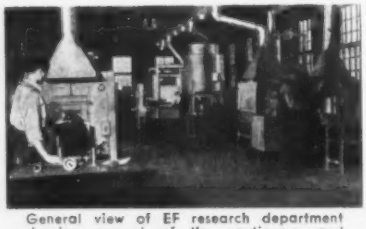


"Lab" furnace strip line over 80 feet long, available for conducting tests on commercial widths of ferrous and non-ferrous strip.



General view of EF research department showing several of the continuous and batch type experimental furnaces.

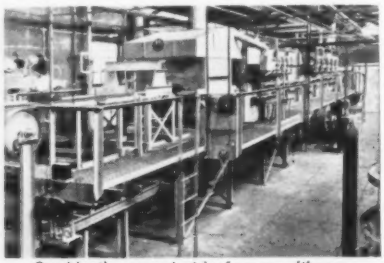
The EF research department is equipped with continuous and batch units including,—continuous wire mesh furnaces;—endothermic and exothermic special atmosphere generators;—forced circulation bell furnaces;—a continuous roller hearth furnace for treating commercial widths of ferrous and non-ferrous strip;—and other equipment.

Consequently,—from test runs—we can determine accurately the combination of temperature, time cycle, atmosphere and other factors needed to produce the exact results desired,—assuring—in advance—the efficient performance of full production furnaces fully up to specifications.

These facilities are available to YOU—for YOUR research or development work, either gratis or for a moderate fee, depending upon the nature of the experiment. We will be glad to schedule time for your tests or technicians.

Write today for our 12 page booklet, "Research Facilities." It describes the equipment we can place at your disposal.

Direct gas fired forced circulation bell type furnace for various processes on wire, rod, strip and other products.



Combination gas-electric furnace with several controlled zones for producing various surface conditions on strip.

BULLETIN No. 461

shows typical installations of EF Gas-fired, Oil-fired and Electric Furnaces.

Send for a copy today!

THE ELECTRIC FURNACE CO.

GAS-FIRED OIL-FIRED AND ELECTRIC FURNACES FOR ANY PROCESS, PRODUCT OR PRODUCTION *Salem - Ohio*

Canadian Associates • CANEFCO, LIMITED • Toronto 1, Canada

ployed Herculite at Mare Island in the construction of a nuclear powered submarine.

Truck Handles Hot Slag

No, this LeT-Westinghouse D Rear Dump isn't being used to haul clouds. But, its cargo is nearly that unusual—it's steaming hot slag, a waste material from the processing and refining of phosphorus.

Run, molten at 2500°F, into pits, the slag is quenched with water sprays to solidify it. It's then loaded

Appearing as light clouds is a truckload of hot slag.

into the haulers which carry it to the waste dump.

The photo was taken at the Monsanto Chemical Co. at Monsanto, Ida. The plant ships more than 50 tank cars of elemental phosphorus each month. In the process of producing this amount.

Canadian Tube Mill

Calumet & Hecla of Canada, Ltd. has completed steel erection for what the company believes will be the first Canadian mill devoted exclusively to the production of seamless copper and copper alloy tubing.

The project, in London, Ont., will consist of a main fabricating building 822 ft long and 104 ft wide, and a building to house engineering, service and stores.

The program will cost $7.25 million by its 1958 completion.

NEW BOOKS

"Applied Reliability" reviews the proceeding of a symposium. Held by the engineering section of the Radio - Electronics - Television Manufacturers Assn., the gathering discussed designing of electronic equipment. Several papers deal with mechanical design. 93 pp. Engineering Publishers, GPO Box 1151, New York 1.

"An Input/Output Analysis of Casting Processes in the Soviet Heavy Machine Building Industry," is an extensive study of the subject. Authored by Michael Boretsky, the book is probably the most comprehensive study generally available. It contains numerous tables and references on casting. Though it's practically impossible to estimate the real efficiency of Soviet casting as a whole, the work does flash some light in previously dark corners. Institute for Research in Social Science, University of North Carolina, Chapel Hill, N. C.

"Practical Automation" is a book with a title that fully explains its content. 376 pp. $7.50 per copy. McGraw-Hill Book Co., 330 W. 42nd St., New York 36.

"Linear Programming," explains the simplex algorithm as used in hand-computed solutions of linear programming problems. It's a well-presented work based on algebra concepts not yet commonly taught to undergraduate students. Authored by D. U. Greenwald, Syracuse University engineering professor, the book could be helpful to data processors or planners with a college math background. 75 pp. $3.00 per copy. The Ronald Press Co., 15 E. 26th St., New York 10.

"Power & Population," discusses Canada's present electricity requirements and the long-term outlook. 25 pp. 10 cents per copy. Mines Branch, Dept. of Mines & Technical Surveys, Ottawa, Canada.

Atom smasher builder

TESTS DISCS...PICKS 3M

AVERY AND SAUL COMPANY, pressure vessel and steel fabricator of Cambridge, Mass., builds electron accelerator tanks for Van de Graaff atom smashers. The 7/8" A-212 Grade B carbon steel (70,000 psi) used in these tanks must be completely clean—free of surface imperfections and scale, and ground to a 125 micro-inch surface. To do this important clean-up job, the company uses coated abrasive discs on air grinders and has experimented with the major brands of discs on the market today.

Results are conclusive: 3M abrasive discs—Grit 36, Type "C"—*have a 50% longer production life than any other disc used,* and do a perfect job of clean-up as required in this high-standards industry.

You can count on the same outstanding results when you put 3M Abrasive Discs to work in your plant. They're famous the world over for quality and dependability—have helped manufacturers everywhere increase production, cut costs. Get the full facts from your 3M Representative, or send the coupon below.

3M ABRASIVES

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Minnesota Mining and Manufacturing Co.
Dept. DD-77, St. Paul 6, Minnesota

☐ Send me FREE booklet "Tips for the Disc Grinding Operator"

☐ Send me FREE booklet "Weld Grinding and Blending"

☐ I'd like to talk with a 3M Representative

NAME.....TITLE.....

COMPANY.....

ADDRESS.....

CITY.....ZONE....STATE.....

Get out the bandages, Princess Wenatchee! Coach Keokuk tried to show our boy how to slide home but Junior helped him go all the way!

You have a real "player" all warmed up and ready to bat for you when you've signed up Keokuk Silvery Pig Iron. This "major league" form of silicon introduction for foundries and steel plants goes all out to hold costs down and quality up. Pig for pig . . . car for car, Keokuk uniformity never varies. Handle by magnet, charge by weight or count the pigs for equal accuracy. Aluminum producers . . . you'll be safe on every play with Keokuk Silicon Metal!

KEOKUK ELECTRO-METALS COMPANY
Keokuk, Iowa
Wenatchee Division, Wenatchee, Washington

When you think of SILICON, think of KEOKUK!

KEOKUK SILVERY PIG IRON

SILICON METAL—OTHER FERROALLOYS

Keokuk Silvery Pig is available in 60 and 30 lb. pigs and 12½ lb. piglets in standard analysis or alloyed to your specifications. Silicon metal and ferro-silicon are supplied in standard sizes and analyses.

SALES AGENT: MILLER AND COMPANY

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3504 Carew Tower, Cincinnati 2, Ohio
8230 Forsyth Blvd., St. Louis 24, Missouri

How To Get More For Your Metalworking Dollar

Number 10 of a series

MACHINING

Ferrous Metals

In This Feature

If modern machining were to adopt a rule for successful operation, that rule would certainly have to reflect the cost aspects of machining. Because machining costs and machining, in a practical sense, are just about inseparable.

All jobs are handled at a price.

Still, cost is not the only major factor likely to affect successful operation. There is also the matter of quality.

And while quality standards may vary in terms of application, the customer invariably assumes that he deserves the highest quality consistent with the lowest possible price.

Most metalworking plants strive to trim costs as well as metal—so long as quality standards can be maintained. But it takes a lot of ingenuity and "know how" to neatly balance all three factors: costs, machining efficiency and quality.

Tips On Machining Stainless

Next time you machine stainless, here are pointers that will make the job easier and more efficient.

Whether the job involves turning, drilling, tapping, milling or reaming — this handy guide is aimed at bigger savings.

■ When it comes to machining stainless steels, some job shops dodge the responsibility like the plague.

Certainly, machining stainless is a challenge for those who haven't tackled the job before. It isn't a dead cinch. Or, as one expert warns: "No stainless steel can be so good that it will perform satisfactorily in the machine shop when mishandled or misunderstood."

Proper Combination — To successfully machine stainless, you've got to know your business. You've got to know that there are such things as proper tools and proper lubricants. That the cuts you take are generally going to be a bit heavier and are going to require a somewhat higher powered motor. That your equipment must be reasonably rigid to avoid chattering and "walk."

Most important, it is necessary to keep in mind that thinking and machining have more than just a little in common. No simple formula solves all stainless machining jobs. But if there is a formula, it must consider job requirements, available equipment, as well as the speeds, feeds, and lubricants likely to do the job best.

Fortunately, the producers and users of stainless have done a rather thorough job of solving stainless machining problems. What's more, they have systematically developed a number of general rules that serve to anticipate trouble before it occurs.

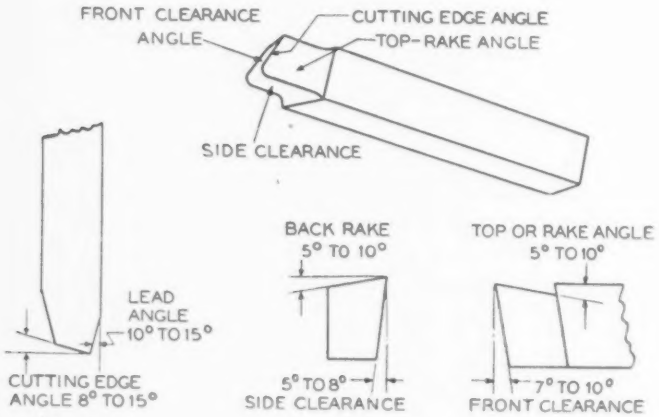
Pointers On Turning—For example, take the most common machining operation of all—turning. While it is impossible to come up with specific recommendations that will apply equally to all turning operations, there are a number of helpful guides that have been carefully checked out in shop practice.

Take a careful look at Table 1. It spells out the high and low range for cutting most of the stainless grades you are likely to use.

Both high and low speeds and feeds have worked successfully in actual shop practice — depending upon the job. So that your first reaction may be to immediately adopt the highest possible speeds and feeds.

This approach is both logical and illogical. Logical, because you want to handle the job in the fastest way possible. Illogical, because to arbitrarily jump to the fastest speeds and feeds is to overlook many of the variables that stand between the successful and the unsuccessful operation.

Good Compromise—The experts suggest that you try the "middle way" as a starting point. In the case of turning Type 302, for example, you might first try a speed of about 63 sfpm with a feed that does not exceed 0.006 in. Then, for best re-


FRONT CLEARANCE ANGLE
CUTTING EDGE ANGLE
TOP-RAKE ANGLE
SIDE CLEARANCE
BACK RAKE 5° TO 10°
TOP OR RAKE ANGLE 5° TO 10°
LEAD ANGLE 10° TO 15°
CUTTING EDGE ANGLE 8° TO 15°
5° TO 8° SIDE CLEARANCE
7° TO 10° FRONT CLEARANCE

How To Grind A Single Point Turning Tool

sults, adjust the speed upward or downward until you are satisfied that your efficiency is about optimum.

Why this trial - and - error approach? Largely because of certain variables that are impossible to control with absolute certainty.

The hardness of the material you're machining is one such variable. Depending upon heat treatment, or the degree of cold rolling, or even minor microstructural variations, it may be just a little bit harder or softer. Such differences are admittedly minor, but you may sometimes have to compensate for them in your machining practice.

You may be surprised to discover that a slightly harder stainless is easier to turn and tends to produce a better surface finish. This is true because the softer stainless material is likely to be tough and gummy.

Plenty of Heat — But hard or soft, stainless grades are bound to develop more heat during machining than the plain carbon steels. Most of this heat builds up at the chip-tool interface.

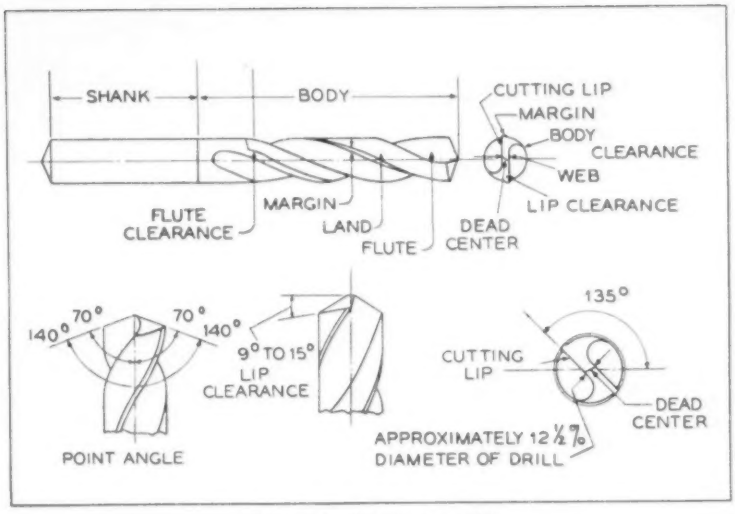
Still, there are a number of things you can do to hold this heat build-up to a minimum.

For one, you can use as large a tool as possible. The larger the tool, the better the heat is dissipated. Some of it is conducted into the body of the tool, while the rest is divided between the work and the cutting fluid.

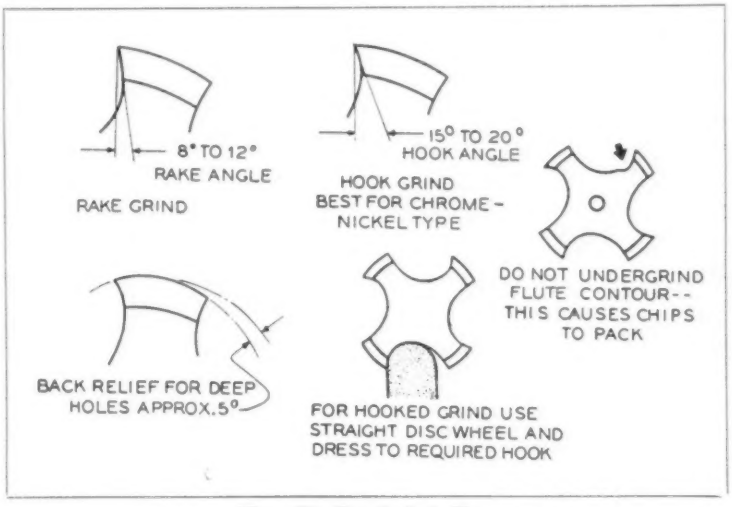
Remember that when the heat build-up is kept at a reasonably low level, the tool cutting-edge stays sharp for a far longer time.

Nothing Shaky—Secondly, it is always a good idea to give the tool cutting-edge maximum mechanical support. To do this, make sure you provide for a minimum front clearance angle. This angle should vary somewhere between 7 and 10 degrees.

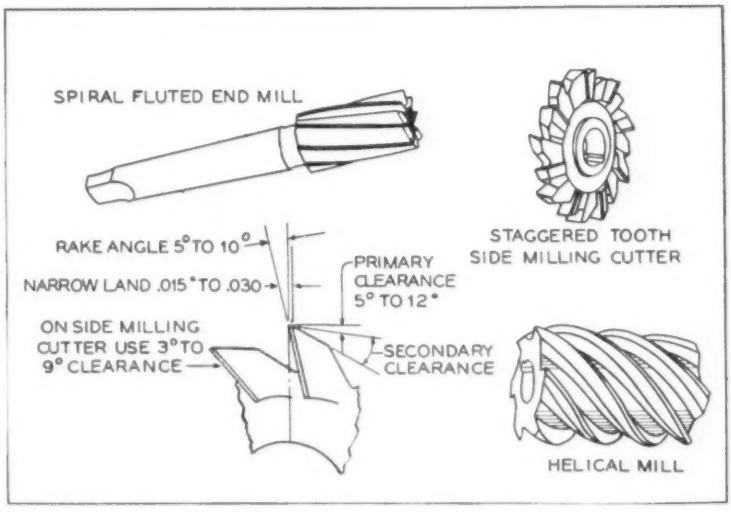
Next, make certain that your top rake is definitely on the steep side. A top rake angle of between 5 and 10 degrees will put you ahead in at least two respects. It will create



How To Grind A Drill


8° TO 12° RAKE ANGLE
RAKE GRIND
15° TO 20° HOOK ANGLE
HOOK GRIND BEST FOR CHROME - NICKEL TYPE
DO NOT UNDERGRIND FLUTE CONTOUR -- THIS CAUSES CHIPS TO PACK
BACK RELIEF FOR DEEP HOLES APPROX. 5°
FOR HOOKED GRIND USE STRAIGHT DISC WHEEL AND DRESS TO REQUIRED HOOK

How To Regrind A Tap


SPIRAL FLUTED END MILL
STAGGERED TOOTH SIDE MILLING CUTTER
RAKE ANGLE 5° TO 10°
NARROW LAND .015° TO .030
PRIMARY CLEARANCE 5° TO 12°
ON SIDE MILLING CUTTER USE 3° TO 9° CLEARANCE
SECONDARY CLEARANCE
HELICAL MILL

How To Grind A Milling Cutter

Never forget the problem of the heat generated at the tool-chip contact point. Use a really effective coolant.

much less heat during turning and give you a freer cutting action. Add to the steep rake ample chip curlers or chip breakers.

If you're after very close tolerances, make sure you use "finishing cuts." If the workpiece involves a taper, it is good practice to turn to within 0.003-0.005 in. of finished size. Make the final finish cut fairly light and run it off at rather high speed.

Keep Cool—Last, never forget the problem of the heat generated at the tool-chip contact point. Make sure you're using an effective coolant. To get a fine finish, adequate cooling is believed to be even more important than lubrication.

A really sharp cutting-edge is especially important when you're turning the austenitic-type stainless steels.

These materials are inherently tough. Although they do not harden as a result of heat treatment, they do work-harden. If sufficient work hardening occurs during turning, you'll get a glazed effect on the workpiece and excessive tool wear.

A combination of sharp cutting-edge and generous rake angle are the best answers to the problem. To make sure that your cutting-edge is as sharp as possible, stone the cutting-edge after grinding.

Smooth and Straight—This extra bit of effort makes a lot of difference in terms of machining efficiency and surface finish. For only a stoned edge is really smooth and straight.

As for the kinds of tools to use, you have a wide variety to choose from. High speed tools are known to give good service in turning stainless. They can stand up for long runs without excessive resharpening, hold close tolerances, and guarantee an acceptable surface finish.

There are also quite a few jobs that call for tungsten carbide tools. By all means, use them when they're needed. The carbides are harder materials and should have superior wear-resistance.

But don't forget that because the carbides are so hard, they are also relatively brittle. They can't be expected to take a lot of vibration or pounding. Make sure they're always fed evenly.

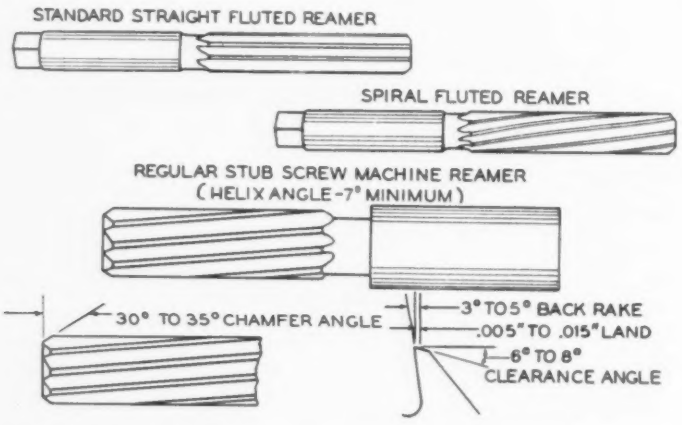
Drilling Hints—When you drill stainless, your objective is to combine a high degree of dimensional accuracy with a reasonable amount of speed. This can be done if you pay attention to a few simple rules.

Most drilling operations require that the chuck, drill shank, and work be kept clean and free of chips. Cleanliness is even more important when you're drilling stainless.

Stainless chips are tough and highly abrasive. If they aren't kept clear of the drill and the work, they will quickly dull the drill. Under certain conditions, they may also affect dimensional accuracy.

After choosing the right drill for the job, your next step is to make sure that the drill is properly ground. So check with the details shown on page 114 to be sure you're on the right track.

Use Special Punch — If you intend to use a punch to locate the



How To Grind A Reamer (This and preceding sketches courtesy The Carpenter Steel Co.)

Formulas For Tapping

1) To obtain tap drill size:

$$\text{Outside Diameter} - \frac{.0130 \times \text{pct Full Thread}}{\text{Number of threads per inch}} = \text{Drill Size}$$

2) To obtain percentage of thread a given drill will produce:

$$\frac{(\text{Outside diam.} - \text{drill size}) \times \text{number of threads per inch}}{.0130} = \text{pct of full thread}$$

drill, make sure it's a three-cornered punch. The ordinary prick punch might work-harden the stainless. In which case, your drill will have a hard time getting started.

Whether or not you use a drill fixture, it is important that the drill be properly aligned and the work adequately supported. Wobbly setups harm drills and produce mostly rejects. As for your cutting lubricant, aim it toward the area where it is likely to do the most good. Don't drill until the lubricant is flowing.

Although speed can't be discounted, proper drilling isn't all speed. Chip congestion must be alleviated periodically. This means that the drill must be backed out now and then. Drill for a distance of three to four times the diameter of the drill on the first bite. Cut this distance in half for the second bite, and in half again for the third.

Use Flutes—If it is at all possible, you may want to provide a groove in the drill for better chip clearance. If you do, make sure that the groove is ground parallel to the cutting edge in the flute. Grooves aid drill life and speed operations a great deal.

Naturally, the rate at which a drill is fed spells out the rate of production. But feeds must never be pushed to the point where they are likely to damage the drill. To select a proper rate of feed, it is always necessary to take into consideration the drill diameter.

Here are some of the recommended feeds for drill sizes under and over 1 in. For drills that are ⅛ in. diam. or less, try a feed rate (per revolution) of 0.0015-0.0025 in. From ⅛ in. to ¼ in. diam., the rate should range from 0.0025 in. to 0.004 in. Other sizes and rates are as follows: ¼-½ in. diam. (0.004-0.007 in.); ½-1 in. diam. (0.007-0.015 in.); 1 in. and over (0.015-0.025 in.).

Proper Tapping—To do a good tapping job, it is essential that the drilled hole be right for the tap. The tap, after all, is not a substitute for the drill. Nor is it designed to

Turning: Speeds and Feeds

Type No.	Surface Feet per minute* (Low and High)	Approximate Feed	Nearest Comparable Equivalent in Ordinary Steels
302	40/85	.003/.008"	Copper-nickel alloys—except No. 4 work-hardens
303	85/120	.003/.008"	SAE 3120, 3145, 4615
316	40/60	.003/.008"	Copper-nickel alloys—except No. 316 work-hardens
321 347	50/95	.003/.008"	Copper-nickel alloys—except No. 321 and No. 347 work-harden
....	60/80	.003/.008"	Copper-nickel alloys—except No. 20 work-hardens
410	80/115	.003/.008"	SAE 3140, 4140, 6140
416	110/140	.003/.008"	SAE 1030, 1120, X1340
420	40/80	.003/.008"	SAE 1095, 3150, 3312
420F	80/110	.003/.008"	SAE 2315, 2340, 2345
430	85/115	.003/.008"	SAE 3140, 4140, 6140
430F	120/150	.003/.008"	SAE 1030, 1120, X1340
440C	40/60	.003/.008"	High Speed Tool Steel
440F	70/90	.003/.008"	SAE 2315, 2340, 2345
443	80/110	.003/.008"	SAE 3145, 3250, 4650

NOTE: The figures shown above are average. On some jobs it may be possible to use even higher speeds. However, on certain work the nature of the part may require slower speeds than are recommended here.

*** All recommendations are based on the use of standard high speed tools.**

The Carpenter Steel Co.

Drilling: Speeds and Feeds

Type No.	Surface Feet per minute* (Low and High)	Approximate Feed (on drills ¼" to ½" dia.)	Nearest Comparable Equivalent in Ordinary Steels
302	15/40	.004/.007" (Use constant feed)	Copper-nickel alloys—except No. 4 work-hardens
303	35/85	.004/.007" (Use constant feed)	SAE 3120, 3145, 4615
316	15/40	.004/.007"	Copper-nickel alloys—except No. 316 work-hardens
321 347	25/50	.004/.007"	Copper-nickel alloys—except No. 321 and No. 347 work-harden
....	30/60	.004/.007"	Copper-nickel alloys—except No. 20 work-hardens
410	35/75	.004/.007"	SAE 3140, 4140, 6140
416	70/110	.004/.007"	SAE 1030, 1120, X1340
420	30/60	.004/.007"	SAE 1095, 3150, 3312
420F	70/90	.004/.007"	SAE 2315, 2340, 2345
430	35/75	.004/.007"	SAE 3140, 4140, 6140
430F	70/115	.004/.007"	SAE 1030, 1120, X1340
440C	20/40	.004/.007"	High Speed Tool Steel
440F	50/70	.004/.007"	SAE 2315, 2340, 2345
443	35/75	.004/.007"	SAE 3145, 3250, 4650

NOTE: The above speeds and feeds are average. For some jobs the higher speeds may be used and on other jobs—depending on the type of work—it may be more economical to use speeds on the lower side.

*** The above speeds are based on the use of high speed drills. When using carbon drills, reduce speeds by 40% or 50%.**

The Carpenter Steel Co.

Avoid broken taps and plugged holes by tapping in two operations whenever necessary. Start with an undersize tap.

correct the mistakes of poor drilling. It simply cuts a thread if the hole provided is dimensionally correct.

Remember that taps, as well as drills, must be kept sharp at all times.

For more adequate chip relief, both spiral fluted and straight flute, spiral-pointed taps can be used. Both types are intended for open or through holes. They work especially well on soft materials. The spiral-pointed tap may be safer to use because it is least likely to jam or damage threads when it is extracted.

Special spiral-pointed bottoming taps should be your best bet for tapping blind holes. Multi-fluted taps are also available for this purpose.

Try Two Operations — But whichever tap you use, avoid overloading. A tap has just so much strength. If it is stressed beyond its endurance it will snap. Avoid broken taps and plugged holes by tapping in two operations whenever necessary. Use an undersized tap to perform the preliminary operation. Then follow up with a tap that will provide the finish size.

Occasionally, you may have to tap a punched hole. Tap it only after you have checked to make sure that the hole is both uniform and of the right size. Forged holes can also cause a lot of trouble if they aren't properly sized before tapping.

On the subject of sizes, The Carpenter Steel Co. finds that the tap drill sizes usually listed in "standard" tables aren't much good for stainless where fine pitches are required. They find that some of the drill errors are too great. To help solve this problem, they have come up with two fairly simple formulas. These are shown on page 116.

Oils Help Machining — Lubrication is an important part of any tapping operation, so don't sell it short. Sulphur base oils are probably the most widely used for this purpose. But there are times when a combination of sulphur base and paraffin base oils are required. Percentages of each type required should be based on the needs of the specific tapping operation.

Just as vital as choosing a good lubricant is making sure that it's being directed to where it's needed. Both the tap and the area to be cut should be lubricated. If this can't be adequately handled by a single stream, try using two—one on each side of the tap.

The lubricant should be fed before the tap is set into motion. Similarly, it should be allowed to flow until after the tapping operation is completed.

Choosing Thread Chasers—For threading operations, choice of a suitable thread chaser is a crucial first step. There are a number of types available. But to some extent, each type has its special virtues for particular applications.

When the problem is to cut close tolerance threads, the tangent type chaser is most frequently used. This type is particularly suited for heavy-duty work on Acme and long, coarse threading. It stands up well in service and, if not abused, does not require frequent re-grinding. Depending upon thread type, it is desirable to use the most suitable throat angle.

Circular type chasers can be used on tubing as well as bar. They can cut all of the standard types of threads. For good results at relatively low cost, the insert type of chaser is also available. It works most effectively with a 20-degree throat angle. Radial type chasers, used to thread ordinary steels, also work well on stainless.

Key Pointers—There are a num-

Tapping Speeds

Type No.	Surface Feet per minute* (Low and High)	Nearest Comparable Equivalent in Ordinary Steels
302	10/20	Copper-nickel alloys—except No. 4 work-hardens
303	15/30	SAE 3120, 3145, 4615
316	10/20	Copper-nickel alloys—except No. 316 work-hardens
321	15/25	Copper-nickel alloys—except No. 321 and No. 347 work-harden
347		
....	12/20	Copper-nickel alloys—except No. 20 work-hardens
410	10/25	SAE 3140, 4140, 6140
416	15/35	SAE 1030, 1120, X1340
420	10/20	SAE 1095, 3150, 3312
420F	15/25	SAE 2315, 2340, 2345
430	10/20	SAE 3140, 4140, 6140
430F	15/40	SAE 1030, 1120, X1340
440C	5/15	High Speed Tool Steel
440F	10/20	SAE 2315, 2340, 2345
443	15/25	SAE 3145, 3250, 4650

NOTE: The figures shown above are average. On some jobs it may be possible to use even higher speeds. However, on certain work, the nature of the part to be tapped may require slower speeds than are recommended here.
* All recommendations are based on the use of standard high speed tools.
The Carpenter Steel Co.

ber of variables involved in threading stainless. One major variable, of course, is the type of stainless you intend to thread. Another is the type of chaser you intend to use. Frequently, your threading practice will reflect a compromise based on these variables.

But whatever the variables, there are also a few simple tips that will help make your threading jobs easier. Based on broad shop experience, here are a few of the tips offered by the Carpenter Steel Co.:

1) Sharp chasers cut better threads. Don't run your chasers too long. It costs less to grind them oftener.

2) To avoid poor threads and possible chaser breakage, make sure your die head has sturdy springs and isn't clogged with chips.

3) Avoid trouble by grinding the throat angles in the set exactly alike. Chasers with short chamfer or throat angles tend to chip or break. Short chamfers require lower cutting speeds and have to be re-ground more frequently.

4) Don't burn your chasers when you're sharpening them. Take light cuts and use a soft wheel.

5) To get threads that are all good, check the work and the threading spindle for proper alignment before you start.

6) If it's at all possible, always chamfer or bevel the work so that all chasers will start cutting at the same time.

7) Use clean cutting oil that is properly blended.

8) Don't push the work too hard. Cutting at too high a speed is usually the main cause of rough threads.

9) To avoid roughing the top of the threads, make sure you have enough hook angle on the face of the chaser.

Guides For Milling — To mill stainless properly, you must start with a machine of adequate size and a high degree of rigidity. The workpiece, too must be correctly supported. Milling cutter design is of utmost importance. It must shear the chips clear of the work

Threading Speeds

Type No.	Surface Feet per Minute*—Low and High				
	Acme Threads	National Fine Threads	Nat'l Coarse or Tapered Pipe	General	Fine Threads
302	12	10/20	18	10/20	5/10
303	12	10/25	18	12/25	5/10
316	12	10/20	18	10/20	5/10
321	12	10/25	18	12/25	5/10
347	12	10/20	18	10/20	5/10
410	12	10/20	18	10/20	5/10
416	12	10/25	18	12/25	5/10
420	12	10/20	18	10/20	5/10
420	12	10/25	18	12/25	5/10
430	12	10/20	18	10/20	5/10
430F	12	10/25	18	12/25	5/10
440C	12	10/20	18	10/20	5/10
440F	12	10/25	18	12/25	5/10
443	12	10/20	18	10/20	5/10

NOTE: The wide range of the above recommendations is due to the possible use o any one of four types of chasers and the variable conditions of material threaded. Slightly harder material (210-240 Brinell) will thread easier than dead soft annealed stainless steels. Each job has to be developed for best production results—keeping in mind speeds should be increased or decreased in small steps.

* All recommendations are based on the use of standard high speed tools.

The Carpenter Steel Co.

Milling Speeds

Type No.	Surface Feet per Minute* (Low and High)	Nearest Comparable Equivalent in Ordinary Steels
302	35/65	Copper-nickel alloys—except No. 4 work-hardens
303	75/110	SAE 3120, 3145, 4615
316	35/65	Copper-nickel alloys—except No. 316 work-hardens
321	35/70	Copper-nickel alloys—except No. 321 and No. 347 work-harden
347	35/70	Copper-nickel alloys—except No. 20 work-hardens
410	70/105	SAE 3140, 4140, 6140
416	100/125	SAE 1030, 1120, X1340
420	35/70	SAE 1095, 3150, 3312
420F	70/100	SAE 2315, 2340, 2345
430	70/105	SAE 3140, 4140, 6140
430F	110/135	SAE 1030, 1120, X1340
440C	35/80	High Speed Tool Steel
440F	65/80	SAE 2315, 2340, 2345
443	70/100	SAE 3145, 3250, 4650

NOTE: The above speeds are average. For some jobs the higher speeds may be used and on other jobs—depending on the type of work—it may be preferable to use speeds on the lower side.

* All recommendations are based on the use of standard high speed tools.

The Carpenter Steel Co.

Broaching Speeds and Feeds

Type No.	Cutting Speed Feet per minute* (Low and High)	Approximate cut per tooth Rd. Broaches	Nearest Comparable Equivalent in Ordinary Steels
302	8/15	.001/.005"	Copper-nickel alloys—except No. 4 work-hardens
303	10/20	.001/.005"	SAE 3120, 3145, 4615
316	8/15	.001/.005"	Copper-nickel alloys—except No. 316 work-hardens
321 347	10/20	.001/.005"	Copper-nickel alloys—except No. 321 and No. 347 work-harden
.....	8/15	.001/.005"	Cooper-nickel alloys—except No. 20 work-hardens
410	10/20	.001/.005"	SAE 3140, 4140, 6140
416	15/25	.001/.005"	SAE 1030, 1120, X1340
420	8/15	.001/.005"	SAE 1095 3150, 3312
420F	10/20	.001/.005"	SAE 2315, 2340, 2345
430	10/20	.001/.005"	SAE 3140, 4140, 6140
430F	15/25	.001/.005"	SAE 1030, 1120, X1340
440C	8/12	.001/.005"	High Speed Tool Steel
440F	8/15	.001/.005"	SAE 2315, 2340, 2345
443	10/20	.001/.005"	SAE 3145, 3250, 4650

NOTE: The figures shown above are average. On some jobs it may be possible to use even higher speeds. However, on certain work, the nature of the part may require slower speeds than are recommended here.

*** All recommendations are based on the use of standard high speed tools.**

The Carpenter Steel Co.

Reaming Speeds and Feeds

Type No.	Surface Feet per minute* (Low and High)	Feed per Revolution for 1/4" to 1" Reamers	Nearest Comparable Equivalent in Ordinary Steels
302	20/60	.003/.020"	Copper-nickel alloys—except No. 4 work-hardens
303	30/100	.003/.020"	SAE 3120, 3145, 4615
316	20/60	.003/.020"	Copper-nickel alloys—except No. 316 work-hardens
321 347	20/60	.003/.020"	Copper-nickel alloys—except No. 321 and No. 347 work-harden
.....	20/60	.003/.020"	Copper-nickel alloys—except No. 20 work-hardens
410	20/60	.003/.020"	SAE 3140, 4140, 6140
416	30/120	.003/.020"	SAE 1030, 1120, X1340
420	20/60	.003/.020"	SAE 1095, 3150, 3312
420F	30/100	.003/.020"	SAE 2315, 2340, 2345
430	20/60	.003/.020"	SAE 3140, 4140, 6140
430F	30/120	.003/.020"	SAE 1030, 1120, X1340
440C	20/60	.003/.020"	High Speed Tool Steel
440F	30/90	.003/.020"	SAE 2315, 2340, 2345
443	20/60	.003/.020"	SAE 3145, 3250, 4650

NOTE: The above speeds are average. For some jobs the higher speeds may be used and on other jobs—depending on the type of work—it may be preferable to use speeds on the lower side. The higher speeds are generally used for sizing work and the lower speeds for smooth finishes.
For hand reaming, allow less material to be reamed due to the difficulty in driving the reamer. For all machine or power-driven reaming, a good starting point is .010" for 1/4" hole; .015" for 1/2" hole and .020" for 1" hole. Determination of feed is controlled by the type of material, chip capacity of reamer, depth of hole and finish required.
*** All recommendations are based on the use of standard high speed tools.**
The Carpenter Steel Co.

so as not to interfere with cutting action.

To make it easier for the chips to part from the workpiece, it is necessary to provide for a greater positive radial rake, hook, or undercut than that used for ordinary steels.

This feature will also serve to lessen the amount of heat generated during cutting. In general, a positive rake angle of from 10 to 20 degrees is recommended. In special cases, this may have to be increased to as much as 30 degrees.

To promote smooth cutting action, a high degree of axial rake (helix angle) is essential. However, this aspect of design must be consistent with the needs of chip disposal.

Watch Rake Angles—You may want to try an axial rake of from 0 to 15 degrees on saws and slotting cutters. For end mills and plain mills, 15 to 50 degrees positive is the standard recommendation. But always make sure that both the radial and axial rake angles are suited to the equipment you're using and the material being milled.

Always provide plenty of chip space for the cutter if you want it to last. As an added help to extending cutter life, keep a sharp eye on chip disposal. Many stainless chips work harden drastically. If these chips get in the way of the cutter and are re-cut, the effect on the cutter could be severely damaging.

Good chip disposal is a relatively simple matter in open cuts. It becomes much more problematical in deep slotting. The same is true of straddle and face milling to a shoulder. The solution: always direct the chips away from the surface being milled.

Metallurgical Factors — As is the case with other stainless machining operations, a major problem in milling stems from the inherent toughness of these steels. The fact that the austenitic grades work-harden further complicates the problem.

All of these metallurgical factors contribute to the high amounts of heat and friction generated during milling. It is generally agreed that milling stainless is more likely to be troublesome than either drilling or turning.

To hold these problems to a minimum, it is good practice to slow down on speed. Always take a heavy, continuous cut. Never allow the tool to idle in the cut. This is likely to cause glazing and work-hardening.

As for feed rate, try to take as heavy a cut as possible. If you're using high speed cutters, the minimum feed per tooth should be about 0.005 in. for roughing and 0.003 in. for finishing. This rule can't always be followed — especially in the case of thread milling operations. Still, it is good practice to maintain the highest possible feed rates.

Avoid Chatter—It is vital that the milling machine operate without chatter and with a minimum of vibration. The toughness of stainless materials automatically raises power requirements. Fixtures, too, must be bigger and stronger.

In milling an austenitic grade such as Type 304, it is estimated that you will probably need about 80 pct more unit horsepower than is required for milling an ordinary low carbon steel.

Two general types of reamers are recommended for use on stainless steels. They are the straight fluted reamer and the right hand spiral fluted reamer. Left hand spiral fluted reamers have the disadvantage of a negative rake. This tends to glaze and work-harden the surface.

In common with milling requirements, machines for reaming must be extra rigid. Reamer alignment with the drilled hole must be accurate to avoid having the back section of the flutes cut on the side of the hole being reamed. So avoid poor alignment unless you're willing to settle for a reamed hole that is torn, oversize, and bell-mounted.

For Better Reaming — Reaming stainless is a relatively slow operation. Reaming speeds are usually about 40 to 60 pct slower than the speeds used in drilling. On the 18-8 grades, speeds seldom, if ever, exceed 40 fpm. Only on the special free-cutting grades is allowable speed likely to run as high as 60 fpm.

According to the Metal Cutting Tool Institute, in those stainless steels that work-harden, the surface of the hole that has been previously drilled, rough reamed, or bored is slightly work-hardened. To ream such a hole properly, remove sufficient stock so that the reamer cutting edges are beneath this surface.

Because of this hole condition, try to avoid the use of long entering leads which remove small amounts of stock over a long cutting edge. If you fail to allow sufficient reaming stock or feed, you're likely to wind up with poor reaming quality. Such practice is also bound to shorten the life of the reamer.

About Tapered Holes—Tapered holes are difficult to ream because the chips are tough and stringy. Also, the reamer you use must be extra sturdy to stand up under the heavy feed pressures required.

To get this extra strength, it is sometimes necessary to cut down on the number of flutes in the tool. This may reduce surface finish quality to some extent, but it is occasionally a necessary compromise.

Broaching is gaining wider use every year. And more and more broaching is being done on stainless steels. The reason is simple. In a single tool, broaching allows you to combine a rough cut, a semi-finish cut, and a final precision cut—all in one operation.

To handle the job properly, a broaching tool is relatively complex from a design standpoint. For this reason, most broaching tools in use are the products of specialists in broaching tool manufacture. Unless you're sure you know all the angles, it is probably a good bet to let a competent manufacturer make your broaching tools.

Resharpening Broaches — The same set of facts applies to resharpening. Broaches should be resharpened only on a regular broach grinder by a highly skilled operator. Many shops prefer to ship their dull broaches direct to the manufacturer for re-grinding.

Make sure your operators handle broaching tools with extreme care. If any of the cutting edges are nicked, a score mark is bound to show up on the surface of the work. Really bad nicks will put a broaching tool out of action permanently.

Remember that broaching requires care, fairly low speeds, and a lot of good lubrication. The lubricants used are usually rather heavy in that they contain very little thinner. Sulphur-chlorinated oils cut with paraffin are probably the most popular for broaching operations.

Choosing Coolants — For the lighter machining operations, water soluble oils are sometimes quite adequate. These oils are extremely effective as far as cooling is concerned. Their weakness lies in the fact that they contribute little towards reducing friction and adhesion.

The sulpho-chlorinated petroleum oils contain active sulphur. The sulphur tends to form a sulphide film which ahderes to both the surfaces of the chips and the tool.

This film is useful in heavy machining operations because it prevents the chips from sticking or welding to the tool. The possible disadvantage of these oils is that the sulphur can produce an abrasive effect that increases tool wear.

On the more difficult stainless machining operations, fatty oils are added to the sulpho-chlorinated grades. This blending improves both cooling and lubricating characteristics.

Proper lubricants often turn an "impossible" job into a neat profit.

Machining Standard Steels

The standard steels — plain carbon, free-machining, low alloy — are usually easier to machine than stainless grades.

But don't let this fact interfere with your search for cost-savers. Here are tips that should prove helpful.

■ The most obvious approach to cutting machining costs is to eliminate machining wherever possible. The geometry of special shapes, forgings, castings, and extrusions allows for such savings.

But even the use of special shapes can only occasionally eliminate all machining. So that, even under optimum conditions, it is likely that some fraction of the general machining problem still remains to be solved.

Steel is one of the most widely used structural materials. For this reason, its machining characteristics and machining costs are of almost universal interest. Both costs and characteristics can vary as a result of three major properties of the material itself.

Major Properties — First, there is the effect contributed by the process used in making the steel. The three leading processes for the mass production of steel are the acid bessemer, the acid or basic open-hearth, and the electric furnace process. Each process may produce differences in the material which can affect machining characteristics —even though these differences are not always of major significance.

Secondly, there is the effect of steel composition. This is the effect contributed by the chemical analysis of the particular steel.

From a practical standpoint, steel analysis (other than stainless) may be broken down into four general families: the plain carbon, the sulphurized, the leaded, and the low alloy grades. Each of these families can again be subdivided into smaller groupings, depending upon certain special properties and characteristics.

Microstructure Counts — Lastly, steels possesss certain mechanical and physical properties that may, and frequently do, affect machining characteristics. These include many aspects of microstructure, particularly grain size and the amount and distribution of microconstituents. Some of these conditions can be altered, or somewhat modified, by heat treatment. Others can be affected by cold or hot working.

Because of these aspects of the problem, it is fairly obvious that many facets of efficient machining are linked directly to the metallurgy of the particular steel. Then, too, there are such factors as the condition of the machine, proper tooling, optimum speeds and feeds, and the use of suitable cutting fluids.

Let's first examine the major metallurgical aspects of machining plain carbon steels at closer range. In contrast with the more complex superalloys, the metallurgy of plain carbon steels is relatively simple.

Starting at the mill, the common grades of plain carbon steels are made as rimmed, semi-killed, or killed steels.

For Fine Grain — The killed steels take in all carbon ranges and virtually all of the low alloy grades. These steels have been deoxidized by means of special ladle additions and have the advantage of a controlled austenitic grain size. Significantly, fine-grained steels are sometimes more suitable for certain machining jobs. But even this fact is not an iron-clad rule.

Semi-killed steels, as the name implies, are only partially deoxidized. Normally, these steels are of the lower carbon grades and are not difficult to machine.

Rimmed steels are less homogenous than either killed or semi-killed grades. Also, they lack controlled grain size. Although they are sometimes preferred for certain fabricating processes, this combination tends to make them less desirable from the standpoint of machining. Always of low carbon content, they provide a less desirable surface finish.

Unalloyed Steels—Plain carbon steels are made up primarily of iron, small amounts of manganese and sulphur, and varying amounts of carbon.

Carbon-free iron (ferrite) is soft and ductile and is low in tensile strength. Because of its "gumminess," it is difficult to machine.

But when carbon is added to iron, important structural changes occur. Properties are altered and tensile strength is vastly increased. Machining properties are similarly improved as the carbon combines with iron to form cementite and the cementite, in turn, alloys with ferrite to form pearlite.

One machinability expert reports that an increase in carbon content up to about 0.30 pct increases the machinability of non-heat treated plain carbon steels. As carbon is increased above 0.30 pct, however, machinability tends to decrease. This condition can be compensated for, at least in part, by proper heat treatment.

Manganese For Strength—Small amounts of manganese serve to improve both the strength and the

Cutting Speeds and Feeds for Standard Tools

TABLE 1	A.I.S.I. B1113	TABLE 2	A.I.S.I. B1112, C1113, C1119	TABLE 3	A.I.S.I. B1111 A.I.S.I. C1116	TABLE 4	A.I.S.I. C1111 A.I.S.I. C1117 A.I.S.I. C1118

Note: The tables below are based on the use of high speed tools and an average eight hour tool life. Feeds are based on the use of multiple spindle type machines using both rough and finish forming tools on cold drawn material. On lighter, single spindle machines using only one forming tool, feeds are usually much lower.

TOOL NAME	Size of Hole—Inches	Width or Depth of Cut—Inches	TABLE 1		TABLE 2		TABLE 3		TABLE 4	
			Surface F.P.M.	Feed In./Rev.	Surface F.P.M.	Feed In./Rev.	Surface F.P.M.	Feed In./Rev.	Surface F.P.M.	Feed In./Rev.
Form—Circular or Dove-Tail		Width								
		.500	225	.003	165	.0025	155	.0023	150	.0022
		1.000	210	.0025	160	.002	150	.0019	145	.0018
		1.500	210	.0025	160	.0018	150	.0017	145	.0016
		2.000	205	.0018	155	.0015	146	.0014	141	.0014
		2.500	200	.0015	150	.0012	141	.0011	136	.0011
Twist Drills	.250		125	.0054	105	.0045	99	.0042	95	.0041
	.500		125	.006	105	.005	99	.0047	95	.0045
	.750		140	.007	115	.006	108	.0056	105	.0055
	1.000		140	.008	115	.007	108	.0066	105	.0064
	1.250		145	.009	120	.008	113	.0076	119	.0073
Box Tool Blades		Depth								
		.125	225	.0085	165	.007	155	.0066	150	.0064
		.250	210	.008	160	.0065	150	.0061	145	.0059
		.375	205	.0065	155	.0055	146	.0052	141	.0050
		.500	200	.0055	150	.0045	141	.0042	136	.0041
Hollow Mills		.062	200	.012	150	.010	141	.0094	136	.0091
		.125	186	.0096	140	.008	132	.0075	127	.0073
		.187	179	.0084	135	.007	127	.0066	123	.0064
		.250	172	.0073	130	.0065	122	.0061	118	.0059
Knurl Tools In Turret (On)			225	.020	165	.015	155	.0014	150	.0014
Knurl Tools In Turret (Off)			225	.040	165	.030	155	.0028	150	.0028
Knurl—Cross Slide			225	.020	165	.015	155	.0014	150	.0014
Chamfer & Facing			280	.008–.010	200	.005–.007	188	.0047 to .0066	182	.0045 to .0064
Reamers	under ½"		180	.0085	145	.007	136	.0066	132	.0064
	½" or over		180	.012	145	.010	136	.0094	132	.0091
Cut Off		Width								
		.062	225	.003	165	.002	155	.0019	150	.0018
		.125	230	.0035	175	.0025	164	.0023	160	.0023
		.187	235	.0035	180	.0025	169	.0023	164	.0023
		.250	250	.004	190	.003	179	.0028	173	.0027

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hardness of plain carbon steels. There is evidence that manganese additions up to about 1.0 pct also improve machinability. Manganese contents above the 1.0 pct level usually have the opposite effect.

The role of sulphur in plain carbon steels is, to some degree, linked with that of manganese. Sulphur, used to produce free cutting grades, combines with manganese to form a sulphide.

While this compound does not contribute to the strength of the steel, it does help to break up the blocks of free ferrite. Since this action affects chip form, it helps to improve machining characteristics.

In the opinion of one expert, the elements normally present in steel have far less effect on machining performance than do the alloying elements added to steels for special purposes. This may provide the clue to why plain carbon steels are not particularly troublesome from the machining standpoint. Certainly more analysis has been devoted to the problems encountered with low alloy and stainless.

High Sulphur Steels—The "free machining" grades, except for minor modifications, are closely related to the plain carbon steels. Their relatively high sulphur con-

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TABLE 5	A.I.S.I. C1144* (C1144, annealed, can be machined at about 10% higher speeds than shown if the feeds are lowered accordingly.)	TABLE 7	A.I.S.I. C1016, C1019, C1022, C1145* A.I.S.I. B1010 A.I.S.I. 4017, 4023, 4024
TABLE 6	A.I.S.I. C1108, C1109, C1114, C1115, C1120, C1125, C1126 A.I.S.I. C1141*, C1151 * Annealed	TABLE 8	A.I.S.I. C1023, C1138, C1144 A.I.S.I. 4032*, 5120 * Annealed

TOOL NAME	Size of Hole—Inches	Width or Depth of Cut—Inches	TABLE 5		TABLE 6		TABLE 7		TABLE 8	
			Surface F.P.M.	Feed In./Rev.	Surface F.P.M.	Feed In./Rev.	Surface F.P.M.	Feed In./Rev.	Surface F.P.M.	Feed In./Rev.
Form—Circular or Dove-Tail		Width								
		.500	140	.0021	135	.0020	130	.0019	125	.0019
		1.000	136	.0017	130	.0017	125	.0016	121	.0015
		1.500	136	.0015	130	.0015	125	.0014	121	.0014
		2.000	132	.0013	127	.0012	121	.0012	117	.0011
		2.500	127	.001	122	.0010	117	.0009	113	.0009
Twist Drills	.250		89	.004	86	.0040	82	.0038	79	.0037
	.500		89	.0045	86	.0045	82	.0043	79	.0042
	.750		98	.0055	94	.0054	90	.0052	87	.0050
	1.000		98	.0064	94	.0063	90	.006	87	.0058
	1.250		102	.007	98	.0072	94	.0068	91	.0066
Box Tool Blades		Depth								
		.125	140	.0059	135	.0057	130	.0055	125	.0052
		.250	136	.0055	130	.0053	125	.0051	121	.0049
		.375	132	.0047	127	.0045	121	.0043	117	.0041
		.500	127	.004	122	.0037	117	.0035	113	.0034
Hollow Mills		.062	127	.0065	122	.0081	117	.0078	113	.0075
		.125	119	.0068	114	.0065	109	.0062	106	.0060
		.187	115	.006	110	.0057	105	.0055	102	.0053
		.250	110	.0055	106	.0053	102	.0051	98	.0049
Knurl Tools In Turret	On		140	.012	135	.0125	130	.012	125	.0110
	Off		140	.024	135	.0250	130	.024	125	.0220
Knurl—Cross Slide			140	.012	135	.0125	130	.012	125	.0110
Chamfer & Facing			170	.005–.0072	163	.0045–.0063	156	.0047–.0066	151	.0042–.0058
Reamers	under ½"		123	.006	118	.0057	113	.0065	110	.0053
	½" or over		123	.0085	118	.0081	113	.0078	110	.0075
Cut Off		Width								
		.062	140	.0017	135	.0016	130	.0016	125	.0015
		.125	149	.0021	142	.0020	136	.0019	132	.0019
		.187	153	.0021	147	.0020	140	.0019	136	.0019
		.250	161	.0025	155	.0024	148	.0023	144	.0022

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tent is intended primarily to improve machinability. They are ideal for many kinds of screw machine operations. They do not rate high in either strength or toughness. They should be used only for parts whose wear and stress levels are known to be low.

Sometimes referred to as "screw stock," these steels are available in a number of different analysis. Generally, they are made with a fairly low carbon content. But medium-carbon grades such as 1340, with a maximum carbon content of about 0.45 pct, are also available.

For best cutting properties, these steels—unlike the low alloy grades—possess a rather large grain size. Their structure consists primarily of ferrite, partially embrittled by additions of manganese and phosphorus.

According to K. G. Lewis, "the view that the better machinability of sulphurized steels is due to reduced resistance to shear or to an increased tendency for the chip to become discontinuous is disproved. . . .

Less Friction—"The reason why high sulphur steels give well broken

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TABLE 9 — A.I.S.I. C1015, C1017, C1020, C1025, C1045*, C1137, C1140
A.I.S.I. 3130*, 4028, 4037*, 4130*, 5132*, 5135*, 8630*
A.I.S.I. E4132*

These steels may be machined at 120 surface feet per minute with feeds as given in Table 9 or at 100–110 surface feet per minute with 10–20% heavier feeds.

TABLE 10 — A.I.S.I. C1010, C1012
* Annealed

TABLE 11 — A.I.S.I. C1030, C1035, C1050*, C1141, C1151, C1146
A.I.S.I. 2330*, 2335*, 3135*, 4042*, 4137*, 5045*, 5140*, 8615, 8632*, 8635*, 8735*
A.I.S.I. E4135*

TABLE 12 — A.I.S.I. C1008, C1145
A.I.S.I. 2317, 3115, 3120, 3140*, 4027, 4047*, 4140*, 4142*, 4608, 4615, 4620, 4621, 4640*, 5145*, 5147*, 6145*, 8617, 8620, 8622, 8637*, 8640*, 8642*, 8720, 8740*, 8742*, 9437*, 9440*, 9442*
A.I.S.I. E4137* * Annealed

TOOL NAME	Size of Hole—Inches	Width or Depth of Cut—Inches	TABLE 9 Surface F.P.M.	TABLE 9 Feed In./Rev.	TABLE 10 Surface F.P.M.	TABLE 10 Feed In./Rev.	TABLE 11 Surface F.P.M.	TABLE 11 Feed In./Rev.	TABLE 12 Surface F.P.M.	TABLE 12 Feed In./Rev.
		Width								
Form—Circular or Dove-Tail		.500	120	.0018	120	.0015	115	.0017	110	.0016
		1.000	115	.0014	115	.0012	112	.0014	106	.0013
		1.500	115	.0013	115	.0011	112	.0013	106	.0012
		2.000	112	.0011	112	.0009	108	.0011	102	.0010
		2.500	108	.0009	108	.0007	105	.0008	99	.0008
Twist Drills	.250		76	.0035	76	.0031	73	.0034	69	.0033
	.500		76	.004	76	.0034	73	.0038	69	.0036
	.750		83	.0047	83	.0041	80	.0045	76	.0044
	1.000		83	.0055	83	.0048	80	.0053	76	.0051
	1.250		86	.0064	86	.0055	84	.0062	79	.0058
		Depth								
Box Tool Blades		.125	120	.005	120	.0042	115	.0049	110	.0046
		.250	115	.0047	115	.0039	112	.0045	106	.0043
		.375	112	.004	112	.0033	108	.0038	102	.0036
		.500	108	.0032	108	.0027	105	.0031	99	.0030
Hollow Mills		.062	108	.0072	108	.0060	105	.007	99	.0066
		.125	101	.0058	101	.0048	98	.0056	92	.0053
		.187	97	.005	97	.0042	95	.0049	89	.0046
		.250	94	.0047	94	.0039	91	.0045	86	.0043
Knurl Tools In Turret		On	120	.011	120	.009	115	.011	110	.0099
		Off	120	.022	120	.018	115	.022	110	.0198
Knurl—Cross Slide			120	.011	120	.009	115	.011	110	.0099
Chamfer & Facing			144	.004–.006	144	.0034–.0048	140	.004–.006	132	.0038–.0053
Reamers	under ½"		104	.005	104	.0042	102	.0049	96	.0046
	½" or over		104	.0072	104	.0060	102	.007	96	.0066
		Width								
Cut Off		.062	120	.0015	120	.0012	115	.0014	110	.0013
		.125	128	.002	126	.0015	122	.0017	116	.0016
		.187	130	.002	130	.0015	126	.0017	119	.0016
		.250	137	.0024	137	.0018	133	.0022	126	.0020

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chips in practice can be found in the fact that lowering the coefficient of friction between chip and tool by any means causes the chip to curl more tightly. The low coefficient of friction values for the higher sulphur steels may be attributed to the behavior of the sulphide inclusions during the cutting process.

"These inclusions have a fairly low melting point compared to that of steel. At the temperatures encountered at the chip-tool interface during cutting, they should be fairly soft and tend to smear over the tool face.

"The hardness of the material is not increased by sulphur addition, since the sulphide formed has approximately the same hardness values as that of ferrite in plain carbon steels. By imparting anti-seizure properties to the steel, it also reduces the tendency for a built-up edge to be produced on the cutting point of the tool, so that a better finish is obtained."

Lead's Advantages — Lead is also added to steel to improve its machining properties. Some years ago, lead additions were largely avoided because they were difficult to make and often resulted in segregation in the steel.

In recent years, however, these

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TABLE 13	A.I.S.I. C1040, C1043 A.I.S.I. 3141*, 3145*, 4145*, 4147*, 5150*, 5152*, 8625, 8627, 8645*, 8745*, 9445*, 9747* A.I.S.I. E4617, E4620	TABLE 15	A.I.S.I. C1045 A.I.S.I. 1320, 1340*, 2340*, 3130, 4340*, 5130, 6120, 8655*
TABLE 14	A.I.S.I. 1330*, 1335*, 3150*, 4150*, 4317*, 4320*, 6150*, 6152*, 8647*, 8650*, 8757*, 8750* * Annealed	TABLE 16	A.I.S.I. C1050 A.I.S.I. 2330, 3135, 8660*, 9255*, 9763 A.I.S.I. E4337* * Annealed

TOOL NAME	Size of Hole—Inches	Width or Depth of Cut—Inches	TABLE 13		TABLE 14		TABLE 15		TABLE 16	
			Surface F.P.M.	Feed In./Rev.	Surface F.P.M.	Feed In./Rev.	Surface F.P.M.	Feed In./Rev.	Surface F.P.M.	Feed In./Rev.
Form—Circular or Dove-Tail		Width								
		.500	105	.0015	100	.0015	95	.0014	90	.0014
		1.000	101	.0012	96	.0012	91	.0012	87	.0011
		1.500	101	.0011	96	.0011	91	.0010	87	.0010
		2.000	98	.0009	93	.0009	88	.0009	84	.0008
		2.500	95	.0007	90	.0007	85	.0007	81	.0007
Twist Drills	.250		67	.0032	63	.0031	60	.0028	57	.0028
	.500		67	.0035	63	.0034	60	.0031	57	.0031
	.750		73	.0042	69	.0041	65	.0037	62	.0037
	1.000		73	.0049	69	.0048	65	.0044	62	.0044
	1.250		76	.0056	72	.0055	68	.0050	65	.0050
Box Tool Blades		Depth								
		.125	105	.0044	100	.0042	95	.0040	90	.0038
		.250	101	.0041	96	.0039	91	.0037	87	.0035
		.375	98	.0034	93	.0033	88	.0031	84	.0030
		.500	95	.0028	90	.0027	85	.0026	81	.0024
Hollow Mills		.062	95	.0063	90	.0060	85	.0057	81	.0054
		.125	89	.0050	84	.0048	80	.0046	76	.0043
		.187	86	.0044	81	.0042	77	.0040	73	.0038
		.250	83	.0041	78	.0039	74	.0037	70	.0035
Knurl Tools On			105	.0094	100	.0090	95	.0085	90	.0089
In Turret Off			105	.0188	100	.0180	95	.0170	90	.0178
Knurl—Cross Slide			105	.0094	100	.0090	95	.0085	90	.0089
Chamfer & Facing			127	.0036–.0050	120	.0034–.0048	114	.0035–.0048	108	.0031–.0043
Reamers	under ½"		92	.0044	87	.0042	83	.0040	78	.0038
	½" or over		92	.0063	87	.0060	83	.0057	78	.0054
Cut Off		Width								
		.062	105	.0012	100	.0012	95	.0011	90	.0011
		.125	112	.0015	105	.0015	100	.0014	95	.0013
		.187	115	.0015	108	.0015	103	.0014	98	.0013
		.250	121	.0019	114	.0018	108	.0017	103	.0016

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difficulties have been overcome. New methods guarantee an optimum dispersion of the lead throughout the steel matrix. Unlike sulphur additions, lead does not adversely affect the mechanical properties of the steel.

Mechanical working of steel—such as rolling—also influences machining characteristics. Cold-drawn plain carbon steels tend to produce a short, brittle chip. Generally, this condition results in a better surface finish and lower chip-to-tool fricton.

Because cold-drawing tends to mechanically harden the ferrite in the steel, it is more effective with the lower carbon grades. With carbon contents above 0.55 pct, heat treating is more likely to improve machinability.

Mostly Mystery — Most experts seem to agree that we don't know enough about the effects of alloying elements on the machining characteristics of low alloy steels. This judgment is probably influenced by the fact that we know a great deal more about the metallurgical effects of alloying elements.

Historically, it is easy to see why most effort was first directed toward the metallurgical aspects. These,

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TABLE 17	A.I.S.I. C1055*, C1060* A.I.S.I. 2335, 2345*, 2515*, 4063*, 4812*, 4815*, 9840*, 9260 A.I.S.I. E2512*, E2517*, E3310*, E4640*, E9310*	TABLE 19	A.I.S.I. C1080*, C1085*, C1095* A.I.S.I. 3140 A.I.S.I. E50100
TABLE 18	A.I.S.I. C1065*, C1070* A.I.S.I. 4068*, 4817*, 4820*, 9261*, 9262*, 9845* A.I.S.I. E3316, E9315*, E9317* * Annealed	TABLE 20	A.I.S.I. 3141 A.I.S.I. E51100, E52100* * Annealed

TOOL NAME	Size of Hole—Inches	Width or Depth of Cut—Inches	TABLE 17		TABLE 18		TABLE 19		TABLE 20	
			Surface F.P.M.	Feed In./Rev.	Surface F.P.M.	Feed In./Rev.	Surface F.P.M.	Feed In./Rev.	Surface F.P.M.	Feed In./Rev.
Form—Circular or Dove-Tail		Width								
		.500	85	.0013	80	.0012	70	.0011	65	.0010
		1.000	83	.0010	78	.0009	68	.0008	63	.0008
		1.500	83	.0009	78	.0008	68	.0007	63	.0007
		2.000	80	.0008	75	.0007	66	.0006	61	.0006
		2.500	77	.0006	73	.0006	64	.0005	59	.0005
Twist Drills	.250		54	.0027	51	.0025	45	.0023	41	.0022
	.500		54	.0030	51	.0028	45	.0025	41	.0024
	.750		59	.0035	56	.0033	49	.0030	45	.0029
	1.000		59	.0041	56	.0038	49	.0035	45	.0034
	1.250		62	.0047	58	.0044	51	.0040	47	.0038
Box Tool Blades		Depth								
		.125	85	.0036	80	.0034	70	.0030	65	.0028
		.250	83	.0033	77	.0031	68	.0027	63	.0026
		.375	80	.0028	75	.0026	66	.0023	61	.0022
		.500	77	.0023	73	.0021	64	.0019	59	.0018
Hollow Mills		.062	77	.0051	73	.0047	64	.0042	59	.0040
		.125	73	.0041	68	.0038	60	.0034	55	.0032
		.187	70	.0036	65	.0034	57	.0030	53	.0028
		.250	67	.0033	63	.0031	55	.0027	51	.0026
Knurl Tools On			85	.0075	80	.0070	70	.0060	65	.0060
In Turret Off			85	.0150	80	.0140	70	.0120	65	.0120
Knurl—Cross Slide			85	.0075	80	.0070	70	.0060	65	.0060
Chamfer & Facing			103	.003–.0042	97	.0028–.0038	85	.0025–.0035	79	.0024–.0034
Reamers	under ½"		75	.0036	70	.0034	62	.0030	57	.0028
	½" or over		75	.0051	70	.0047	62	.0042	57	.0040
Cut Off		Width								
		.062	85	.0010	80	.0009	70	.0008	65	.0008
		.125	90	.0012	85	.0012	74	.0011	69	.0011
		.187	93	.0012	87	.0012	77	.0011	71	.0011
		.250	98	.0015	92	.0014	81	.0012	75	.0012

Republic Steel Corp

essentially, were low alloy steels' principal reason for being. For these steels were specially developed for their better strength, wear resistance, and other important mechanical properties.

Tonnage-wise, low alloy steel production has moved in a continuous upward trend. Because of their known advantages, these steels are going into the manufacture of more and more products. And with this increase in popularity, the need for more machining information has become increasingly more acute.

Helpful Key—Fortunately, there is a good deal of basic machining information available for specific low alloy grades. Although intended primarily as a guide, the accompanying tables listing cutting speeds and feeds are of great practical value to the machine shop. They comprise recommended machining conditions for almost all of the standard grades of plain carbon, free machining, and low alloy steels.

Without exception, low alloy steels—regardless of carbon content—can be heat treated in a manner that will improve their machinability. Such heat treatment is intended to produce a combination of hardness and structure likely to

make machining easier, promote attainment of a good surface finish, and reduce tool wear.

Low carbon grades containing less than 0.25 pct carbon are commonly used in connection with case carburizing. Nickel, chromium, molybdenum, and vanadium are the principal alloying elements added to these grades to improve their mechanical properties and provide better control in heat treatment.

All Heat Treated—Most of the machining on these steels is completed before carburizing. For best machining results, the materials are usually machined in the normalized, the annealed, or the normalized-annealed condition. Choice of proper heat treatment depends largely on the composition of the steel.

Medium-carbon, low alloy steels will usually machine more efficiently if they are first normalized and annealed. The only question that appears to remain in doubt is whether these grades machine better with a lamellar or a sphereoidized structure.

In general, the sphereoidized structure is recommended for automatic machining operations. The lamellar structure is preferred for such operations as broaching and hobbing.

Because of the combination of alloy content and higher carbon, these steels can be made to respond to a variety of cycle annealing treatments. Starting with a fairly high temperature, the steels are first normalized.

Avoids Stresses — This part of the cycle acts as a kind of solution treatment and also eliminates residual stresses likely to cause subsequent distortion. A lower temperature soaking period follows in order to complete transformation and produce the desired structure.

High-carbon, low alloy grades are usually machined in the spheroidized - annealed condition. Not only does this treatment serve to improve machining characteristics, but it also produces a structure that will harden properly after machining. A mixed structure containing a relatively small percentage of lamellar pearlite has also been found to be desirable.

Of the cast steels, plain carbon grades with a carbon content of 0.25-0.35 pct are produced in the largest quantities. Lower carbon grades are more difficult to cast. The lower carbon also results in a gummy structure that can increase machining problems.

Easy To Cast — But the 0.30 pct carbon grades are known to combine good casting properties with excellent machinability. This machinability is not likely to be derived with the as-cast, dendritic structure. Furthermore, when normal machining stresses are added to inherent casting stresses, the chances of severe distortion are proportionately increased. For these reasons, heat treatment is almost always essential.

Recommended heat treatment consists of a normalize-anneal. In addition to relieving casting stresses, this heat treatment serves to provide a more homogeneous structure and acts as a grain refiner. The only known limitation to the effectiveness of heat treatment is section size. Sections that are 5 in. or more in thickness are likely to be sluggish in their response to heat treatment.

Alloy Helps — As is the case with wrought materials, cast steels can achieve better mechanical properties by means of alloying additions. For the most part, this improvement is gained by the addition of two or more elements.

Six alloying combinations are most commonly used in cast, low alloy steels: 1) nickel-chromium, 2) nickel-manganese, 3) nickel-molybdenum, 4) manganese-molybdenum, 5) chromium-molybdenum, and 6) chromium-tungsten.

It is generally agreed that cast irons run the gamut of machinability ratings. Some are among the easiest of metals to machine. Others are among the most difficult. This is true because cast irons take in a variety of materials, ranging in alloy content, relative hardness, mechanical properties, and structure.

Large Assortment — Considering the properties of tensile strength and ductility alone, the cast irons present an amazing array. In terms of strength, some grades range as low as 20,000 psi while others are rated at well over 100,000 psi. Elongation, too, will range all the way from close to 0 pct to well over 20 pct.

Cast irons are classified primarily in terms of their microstructure. Five principal types and their chief microstructural constituents comprise: 1) white irons (pearlite and massive cementite), 2) mottled irons (pearlite, free carbon, and enough iron carbide to produce a mottled fracture), 3) pearlitic irons (pearlite and free carbon), 4) pearlitic malleable irons (pearlite, silico-ferrite, and free carbon), and 5) malleable iron (containing silico-ferrite).

In most cases, heat treatment helps to simplify machining.

ACKNOWLEDGMENT

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MACHINING PERFECTION always starts with the right steel

Pick exactly the right steel for any job from J & L's complete cold finished line

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This valve cap for drums requires considerable surface machining, drilling and tapping. Comparison test with the previously used open hearth leaded steel shows J&L "1113" leaded Bessemer steel upped production 31% . . . permitted change from a 15-second to a 10⅓-second cycle. Surface finish is smoother. J&L leaded steels assure you higher cutting speeds, longer tool life. Get facts from your distributor or write to Jones & Laughlin, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

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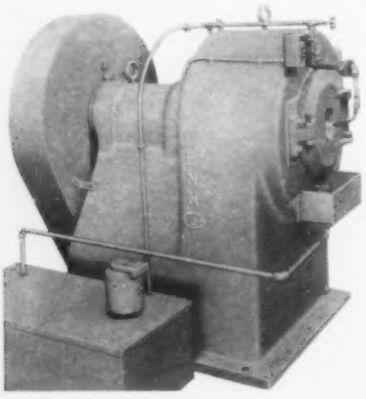
New Production Ideas

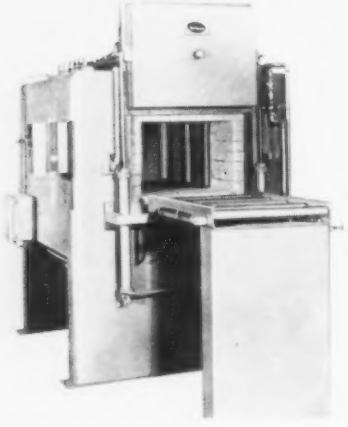
Equipment, Methods and Services



Swager Works Long Tapered Items At Rapid Clip

If involved machining setups are complicating your production of long tapered tubular products, maybe a new swaging unit is your answer. This swaging machine simplifies considerably the making of tapered items such as furniture legs and similar products. It turns out these at a rapid pace, leaving a fine surface on the finished work. The swager makes tapers up to 15-in. long on tubing up to 2¼-in. diam. It produces these in a single pass, at a rate of six per minute. Handling ferrous or nonferrous materials from stainless steel to aluminum, the unit works both welded and seamless tubing. Following the one-step operation, the work leaves the machine with a fine finish, according to its maker. A key feature of the unit is a system that re-circulates coolants used with it. (Fenn Mfg. Co.)

For more data circle No. 40 on postcard, p. 141



Furnace Features Even Heat Distribution

Six radiant tubes inside this "in-and-out" tempering or drawing unit assure it of even heat distribution. With a maximum operating temperature of 1400°F, the furnace is designed for lone use or for merging with an integrated heat-treat system. It's built to a standard height for in-line use with other equipment made by the manufacturer. Equipped with or without a cooling chamber, the unit is manually loaded into the heating chamber from a roller platform. Setups with a cooling chamber pass work straight through; those without it use the same door for loading and unloading. Furnace work area is 24 wide x 36 long x 18-in. high. The sealed alloy radiant tubes in the unit's gas burners have a maximum input of 500,000 Btu per hour. These result in even temperatures at all times. All components come completely piped and wired. (Eclipse Fuel Eng. Co.)

For more data circle No. 41 on postcard, p. 141

Plastic Jars Improve Performance of Batteries

Big storage batteries now come in plastic jars. The strong, lightweight, heat-resistant polystyrene jars have several advantages. Thanks to them, one battery maker has increased the rated capacity of its batteries. Leakproof, the containers make possible a substantial increase in electrolyte volume. The jars are 19⅝-in. deep, 14½ x 13 5/32-in. length and width. They are used with the manufacturer's stationary power units. Batteries rate from 415 to 1173 ampere-hours at an 8-hour discharge rate. Uses of the plastic jars lets the firm enlarge plate size to gain a reported 11 pct in rated capacity. Permanently bonding the plastic cover to the jar results in leakproof construction. Providing greater space between plates and the top and bottom of the jar than was previously possible, the container allows for a substantial increase in electrolyte volume. (The Electric Storage Battery Co.)

For more data circle No. 42 on postcard, p. 141

This membership seal means

consistent good quality in PHILLIPS CROSS-RECESSED HEAD SCREWS

Manufacturers of Phillips Cross-Recessed Head Screws who are entitled to the above seal do a good deal more than compete in selling these famous fasteners. They share quality control methods that bring worthwhile advantages to your assembly operations.

Consistent good quality fasteners for your product from these reliable sources are assured by common adherence to precision accuracy of dimensional standards, inspection gauges and gauging methods established by the Phillips Cross-Recessed Head Standards Committee sponsored by Screw Research Association.

You can rely upon these sources for product reliability which assures correct mating fit between recess and driving point. This eliminates driver slippage and prolongs driver and bit life, improves product appearance and reduces your costs.

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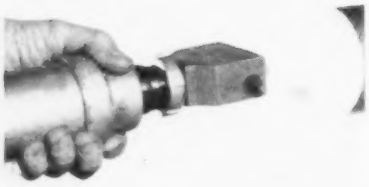
You can rely on these sources . . . for product reliability

American Screw Company • Atlantic Screw Works, Inc. • The Blake & Johnson Co. • Central Screw Company • Continental Screw Co. • Elco Tool and Screw Corporation • Great Lakes Screw Corp. • The H. M. Harper Company • The Lamson & Sessions Company • National Lock Company • The National Screw & Manufacturing Company • Parker-Kalon Division, General American Transportation Corporation • Pheoll Manufacturing Co. • The Progressive Manufacturing Company Division, The Torrington Company • Scovill Manufacturing Company • Shakeproof Division Illinois Tool Works • The Southington Hdwe. Mfg. Company Sterling Bolt Company • Universal Screw Company • Wales-Beech Corporation

Truck Carries Four Full Batches of Materials

Thanks to a new body design, this truck is capable of hauling and unloading four full batches of raw materials. Originally made for carrying cement, the truck readily adapts to the transporting of many similar materials. Its body features three batch gates and four carrying boxes. Each gate is air-controlled by a double throw switch in the cab; 12v solenoid valves operate the air cylinders. The carrying boxes are moisture resistant and fully anchored. Yet, they can be removed almost instantly. Each is fully enclosed and has a capacity of 12 cu ft. The 11½-ft long body has an 8-cu yd capacity without the boxes. A 15-ton capacity lift hoist provides lifting power for the truck. (Anthony Co.)

For more data circle No. 43 on postcard, p. 141



Pneumatic Unit Marks Hot or Cold Work

For hot or cold metal marking, a single impact air marker is lightweight and portable. It comes in handy, points out its maker, for making clean, clear impressions on items not easily moved to a big marking machine. Weighing only 12 lb, including its body, head and type, the marker works with very low air pressures; 50 lb pressure will operate it. Interchangeable type holders accommodate six 3/16-in. characters, four ¼-in. characters, or individual characters to ½-in. (The Pannier Corp.)

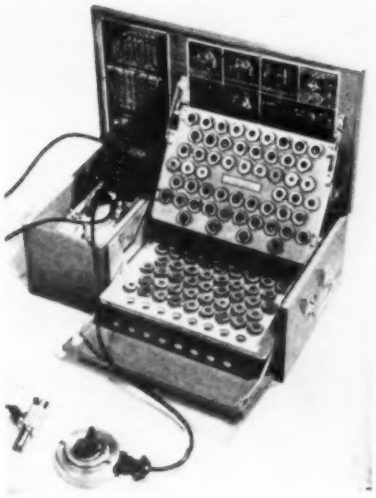
For more data circle No. 44 on postcard, p. 141

KILLING THE DEEP-DRAW BUGABOO
Bert, we're in trouble—too many rejects. They're up to one in seven. We'd better find out what's wrong—fast.
Yes, Tony, our Whitemarsh Lab tells me your rejects can be cut 'way down with a Pennsalt dry lubricant—and it'll pay for itself in no time.
OK—we'll make a trial run Tuesday.
THE NEXT MONTH

Locates Holes Precisely Before Jig Drilling

Fast, simple and portable; that describes this locating device for jig drilling and reaming to precise limits. The electro-mechanical locater is accurate to ±0.0005-in. It's recommended for setups where size or shape precludes jig boring work. The equipment also is handy for use on fixed objects after complete assembly; it does away with dismantling the item. The main unit is a 4½-in. circular base housing the centering device; inside this is an internally-lighted reticled optical unit. Its base contains a powerful electro-magnetic coil which firmly grips any flat steel surface at any angle. The centering device possesses a simple arrangement of uniform eccentrics; these turn and lock, one inside the other, to provide compound movement for rapid and easy location. Its electrical equipment plugs into any wall outlet or lighting point on alternating current. The locating unit can be employed in virtually any position in practically any work area. Overall weight of the entire device is 43 lb. (Wharton & Wilcocks of America, Inc.)

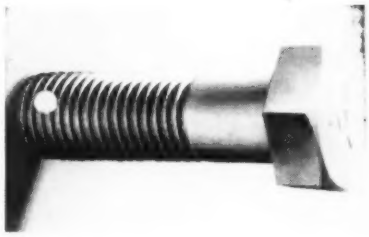
For more data circle No. 45 on postcard, p. 141



Self Locking Screws Come On-The-Shelf

Hex-head cap screws with nylon inserts now come as on-the-shelf items from one supplier. These self-locking screws are available in ¼ to 1-in. diams. These screws are made self-locking and self-sealing by means of a nylon pellet inserted in the threaded section of the screws. Thus, the fasteners do away with using auxiliary locking devices. (Cleveland Cap Screw Co.)

For more data circle No. 46 on postcard, p. 141



I know what's wrong. We're picking up on the die 'cause this lubricant isn't holding up.
Die pick-up. Hm. An ad I read yesterday says we can get a Pennsalt dry lubricant that'll last even through severe draws like this. I'll call in Frank Wilcher from Pennsalt.
Frank, our reject rate has fallen 'way down—never more than one in a hundred. The shop's cleaner now, too, and our dies last twice as long. You got rid of our worst bugaboo!

Remember—nobody knows more about metal processing chemistry than Pennsalt. Even if your trouble may not seem to involve your Pennsalt salesman, call him in anyway. Or write

Pennsalt Chemicals

Metal Processing Dept. 462
Pennsalt Chemicals
3 Penn Center, Phila. 2, Pa.

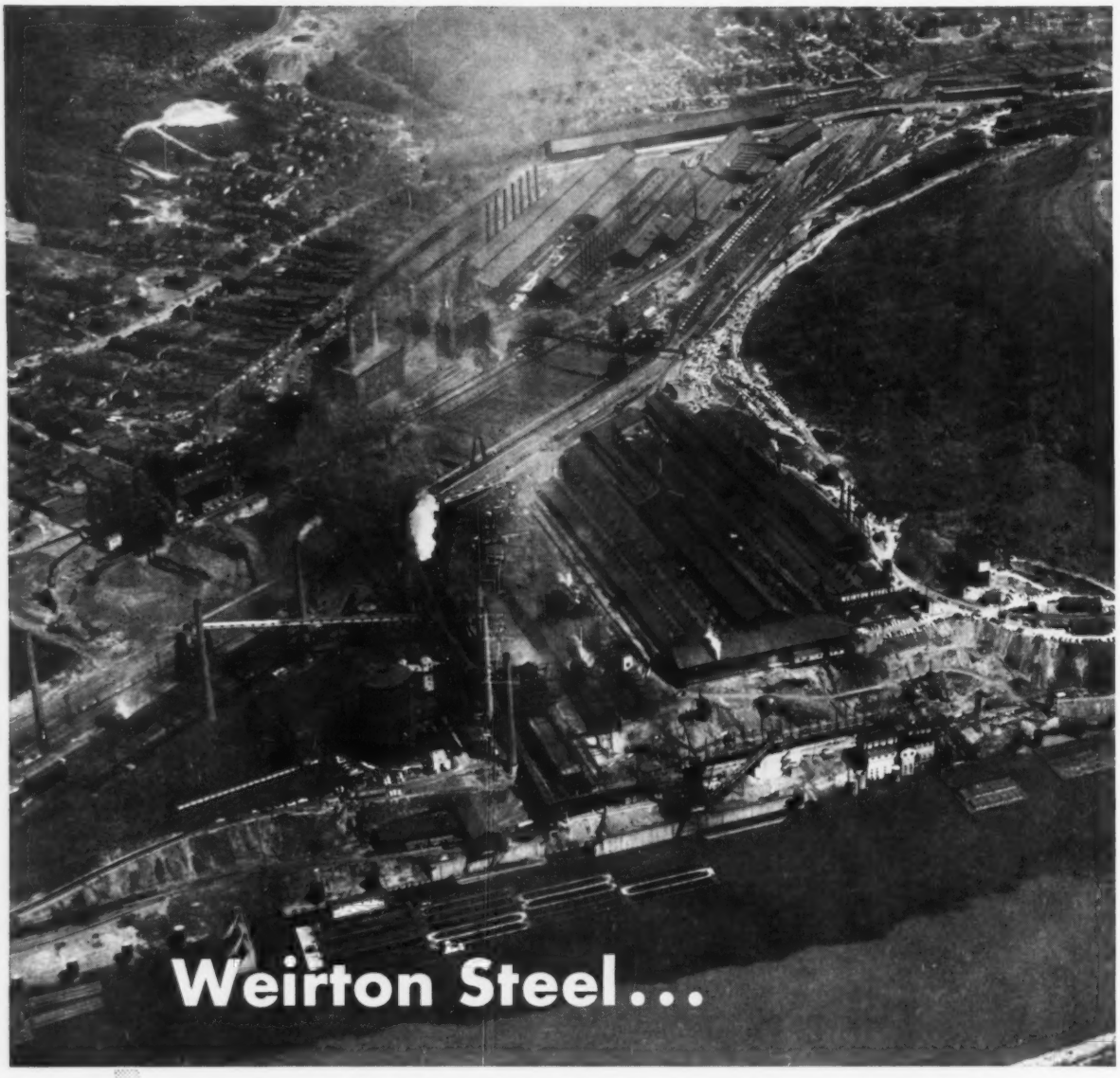
Please send me information on Pennsalt
☐ cold-working lubricants
☐ metal cleaners ☐ phosphate coatings

Name _____

Company _____

Street Address _____

City _____ Zone ____ State _____



11 year continuity in oxygen production with "on-location" generators

Since 1946, Weirton Steel Company, a division of National Steel Corporation, has obtained its oxygen requirements from "on-location" generators . . . designed and built by Air Products, Incorporated. Present production capacity is 300,000,000 cu.ft./mo. of low-purity (95%) and 35,000,000 cu.ft./mo. of high-purity (99.5%) oxygen . . . for all uses from blast furnace air enrichment to scarfing.

Many steel companies obtain low-cost oxygen from dependable Air Products generators in many combinations of quantity, purity and pressure.

We produce: package, tonnage and custom-built oxygen and nitrogen generators. Check with us for detailed information on a dependable and continuous supply of low-cost oxygen. Air Products, Incorporated, P.O. Box 538, Allentown, Pa.

Air Products
...INCORPORATED

Weirton Steel...

. . . put three 2,000 cfh oxygen generating plants (total—4,000,000 cf/month)—built by Air Products—into operation over eleven years ago. Since that time, Air Products has met the increasing needs for oxygen at Weirton by supplying additional oxygen facilities (up to the present 335,000,000 cf/month total capacity).

This continuity of a low-cost supply of oxygen over the years has been possible only through the use of dependable "on-location" generators—designed and manufactured by Air Products.

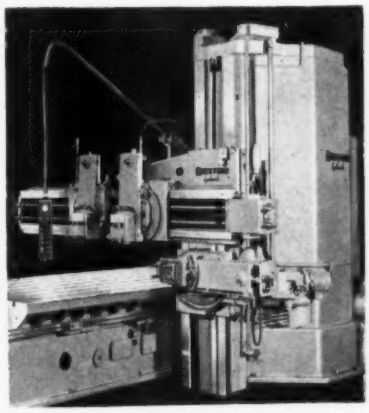
Continuity of supply at Weirton is a typical benefit resulting from steel companies' use of "on-site" oxygen generators. Other steel companies enjoy such profitable advantages as: substantial reductions in oxygen cost . . . dependable production of high purity oxygen 24 hours/day . . . flexibility in meeting increased or decreased demand through proper equipment sizing. Even plants requiring limited quantities of oxygen can profitably use Air Products generators.

Let us show you how you can have a dependable low cost supply of oxygen without capital investment. Air Products "on-site" oxygen generators supply many of the nation's leading steel plants. We'd like to talk to you about them . . . your inquiry is invited. Air Products, Incorporated, P.O. Box 538, Allentown, Pa.

Air Products ...INCORPORATED

Hydraulic Planer

This heavy-duty hydraulic planer employs two-speed traverse motors that eliminate manual positioning while setting up the machine. It features power rapid traverse, power rail elevation, automatic power rail-lock, and automatic way lubrication. The unit has an extremely heavy column, crossrail, and head. A one-piece L-shaped rail design assures continued accuracy over the full life of the machine. Rugged



sidehead and railhead construction permit use of the proper tool for each job. An adjustable sidehead rail permits accurate and permanent alignment of the sidehead with the railheads. The heavy box-section table is carried on wide angle V-ways. This planer comes in 60 x 60-in. models. It's available with either the conventional single circuit or a new high-speed triple circuit. (Rockford Machine Tool Co.)

For more data circle No. 47 on postcard, p. 141

Milling Machines

Germanium can be milled on a new series of milling machines. The units also work silicon and quartz. (U. S. Burke Machine Tool Div.)

For more data circle No. 48 on postcard, p. 141

Testing Machines

Low capacity testing machines now come in standard 100 to 5000-lb capacities. These electromechanical units feature electronic load indication on a large dial. Each machine has two ranges: full and 1/5 or 1/4 capacity; both show up on the same dial. Testers can change the range at will during testing by flipping a switch. Infinitely variable testing speeds from 0.3 to 12 ipm are electrically controlled and are positive under load or no load. Units take up less than 5-ft floor space. (Tinius Olsen Testing Machine Co.)

For more data circle No. 49 on postcard, p. 141

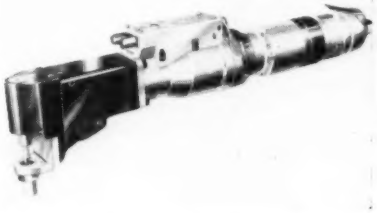
Parts Marker

Looking for a way to mark parts during production machining operations? If so, a new automatic roll marker might interest you. It marks end surfaces of production parts during work cycles on screw machines and other multiple-station units. This cuts out secondary marking setups; speeds production. (New Method Steel Stamps, Inc.)

For more data circle No. 50 on postcard, p. 141

Air Drill

This drill produces accurate holes in small spaces even in hard metals. The air drill operates in spaces as small as 4 x 4 in. It drills



within ½-in. of corners. Yet, the tool delivers to 3000-lb thrust. It uses ¼-20 threaded aircraft drills. (Gardner-Denver Co.)

For more data circle No. 51 on postcard, p. 141

Radial Positioner

Thanks to a new mechanical-action positioning device, this portable magnetic drill press' drill point can rotate a full 330°. This makes

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"Old Hands" at cold forming in all metals.

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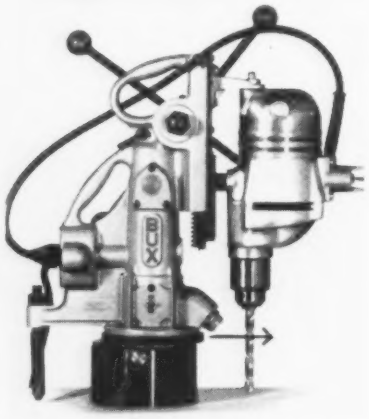
NEW EQUIPMENT

for accurate positioning every time. A one-quarter turn of the positioner locking handle frees the drill post for radial turning up to 300°, or for lateral movement to guarantee



precision alignment of the unit for tapping, reaming or drilling. Besides increasing the accuracy of the portable magnetic drill press, the positioner increases safety performance. The powerful electromagnetic base is on full-force at all times to safely hold the drill press to the work. This keeps an operator from losing control of the unit while positioning. (Buck Mfg. Co.)

For more data circle No. 52 on postcard, p. 141

Scrap Baler

An entire auto body enters a new scrap baling press and comes out as a compact package. The press has a gathering box 5-ft deep, 6-ft wide, 12-ft long. (Superior Machine Co.)

For more data circle No. 53 on postcard, p. 141

Smoke Indicator

Teaming up for better smoke spotting is a wide-angle periscope and an electric-eye. This setup gives both visual and electronic views of stacks, etc. (Ess Instrument Co.)

For more data circle No. 54 on postcard, p. 141

Hose Assembly

Made of teflon, a new hose assembly features reusable fittings. Hose lines made of this material, says the manufacturer, excel in applications requiring lubricity, nonadhesion of sticky or viscous materials. They resist temperatures up to 500°F, are chemically inert and long wearing. (Aeroquip Corp.)

For more data circle No. 55 on postcard, p. 141

Fire Extinguishers

Two new pressurized dry chemical fire extinguishers are highly portable. These streamlined firefighting units come in 20- and 30-lb capacities. Their operation is simple. Anyone can pick up a unit in an emergency, aim the discharge horn at the fire and pull the trigger. Immediately a cloud of flame-killing dry chemical envelops the blaze. There is no trigger locking pin to remove, no valve to turn, no inverting, and no bumping. The new 20- and 30-lb capacity units are approved by Underwriters' Laboratories and Factory Mutual.

For more data circle No. 56 on postcard, p. 141

• FOR SALE •

Valuable High Grade Limestone Property

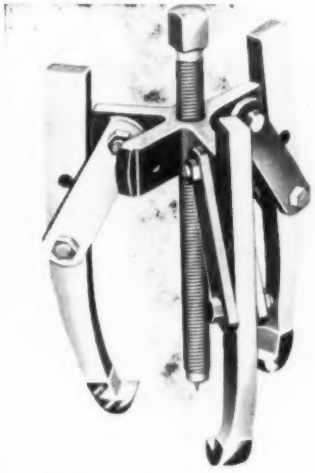
1500 acres containing a HUNDRED MILLION TONS of 95% pure calcium limestone 39-78 ft. thick with negligible overburden. The prevailing minimum freight rate of 6¢ per 100 lbs. to Toronto has been obtained from the Railway serving the location.

Results of extensive drilling and chemical analyses are available to serious principals.

ADDRESS BOX G-590
Care The IRON AGE, Chestnut & 56th Sts.,
Phila. 39, Pa.

Gripper-Pullers

Two points for gripping or three points for gripping are now available in a single jaw puller. The combination pullers can change from two-jaw to three-jaw operation by simply shifting one jaw and adding another. Thus, a user gets the advantages of six puller sizes with only three puller heads of the



combination types. (Owatonna Tool Co.)

For more data circle No. 57 on postcard, p. 141

Stamped Nuts

Nuts stamped from stainless steel feature several advantages. According to their maker, these light-

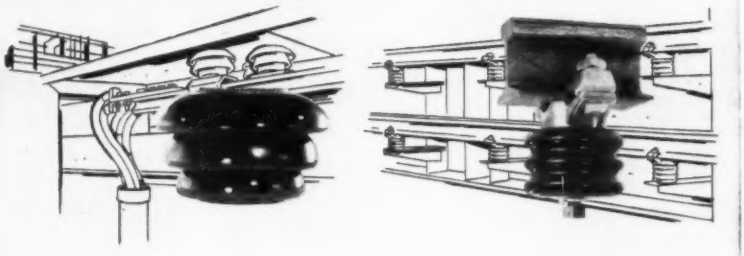
weight nuts meet high temperature, non-magnetic and corrosion-resistant requirements. Torque is produced with these nuts, even in repeated use, without distorting the threaded hole. The thread-gripping load is carried by six structural bracing fins which provide uniform tension around respective studs. (Tubing Seal Cap, Inc.)

For more data circle No. 58 on postcard, p. 141

STRENGTH

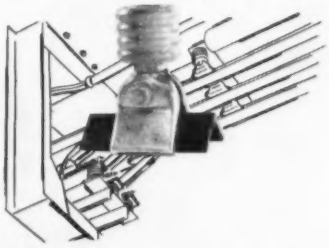
Which kind of strength do you need in insulators for traveling-contact equipment?

MAXIMUM ELECTRICAL STRENGTH



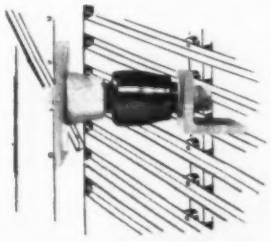
Wet-process porcelain insulators, such as these, offer outstanding electrical properties for high-voltage contact-rail insulation. Especially recommended where dirt, moisture, and other contaminants prevail.
Also available are dry-process porcelain units for power circuits.

MAXIMUM IMPACT STRENGTH



Molded polyester-fiberglass insulators and fabric-reinforced insulators of this general type have exceptional impact strength and vibration-resistance combined with good electrical properties. Tailored to resist chemicals, thermal shock, weathering.

MAXIMUM TENSILE STRENGTH



Molded Giant Strain insulators, adaptable to miniaturization where space is restricted, offer unusual mechanical strength. A very economical insulator having diverse applications.

TO HELP YOU DECIDE

. . . on the right combination of properties to meet your insulator needs, Delta-Star engineers from coast to coast invite your problems. Phone the nearest Delta-Star district office or write to Electric Service Works, Delta-Star Electric Division, H. K. Porter Company, Inc., 17th & Cambria Sts., Philadelphia 32, Pa.

ELECTRIC SERVICE WORKS
DELTA-STAR ELECTRIC DIVISION
H. K. PORTER COMPANY, INC.

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 141.

Heavy Packaging

How to cut packing costs when shipping heavy goods is told in a 28-page booklet. It deals with packaging pumps, machine parts, nails and motors inside corrugated cartons. (Hinde & Dauch.)

For free copy circle No. 1 on postcard, p. 141

Handling Hints

Looking for some materials handling tips? If so, a company publication just out offers several. Some 60 photographs and 16 pages show many time and cost cutting ideas. (Lewis Shepard Products, Inc.)

For free copy circle No. 2 on postcard, p. 141

Motors

Several stock and price lists include data on a wide variety of electric power setups. Number referenced for filing, the sheets cover motors, generators, frequency changers, converters, drives and other equipment. (Chicago Electric Co.)

For free copy circle No. 3 on postcard, p. 141

Spray Lubrication

Discussing the development of spray lubricating systems is a dozen-page brochure. This extensive treatise also delves into spray lube applications, giving operating details, nozzle theories, spray pattern evaluations and case histories. (The Farval Corp.)

For free copy circle No. 4 on postcard, p. 141

Automated Chuck

Chucking equipment for automatic gear finishing operations is described in a folder. It outlines an automated gear chuck. (Garrison Machine Works, Inc.)

For free copy circle No. 5 on postcard, p. 141

Foundry Facts

A 4-page publication details a standard collaspsibility test for shell mold and core materials used with light metals. (Chemical & Metallurgical Div., General Electric Co.)

For free copy circle No. 6 on postcard, p. 141

Lab Ware

Polyethylene laboratory ware, including bottles, funnels, beakers, tubes, etc, is described in a catalog. (The Harshaw Chemical Co.)

For free copy circle No. 7 on postcard, p. 141

Self-locking Bolts

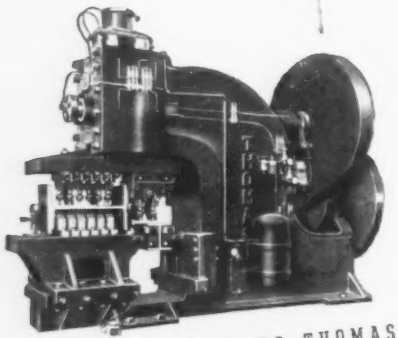
Self locking bolts are reported on in a 4-page folder. It explains how the fasteners' nylon lock inserts hold them tight, seated or not. And they can be used re-used without affecting the seal's tightness. (Republic Steel Corp.)

For free copy circle No. 8 on postcard, p. 141

Tank Lining

A technical bulletin deals with a synthetic elastomer prevulcanized protective tank lining. In sheet

BEAM PUNCHING
without tool change



THE newly designed Thomas Beam Punches are built in sizes to handle beams up to 12"-18"-24"-30" and 36", web and flange punching, with a single tool set-up. Any of the five sizes may be used with or without a Thomas spacing Table, depending on production needs.

THE TREND IS TO THOMAS

THOMAS
MACHINE MANUFACTURING CO.
PITTSBURGH 23, PA.

• *Write for further information*

PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

51 a

form, this product is an isobutylene material. It applies easily in the field. However, the report points out, it should be installed only by experienced personnel. The publication also describes cements and putties for fabricating liners. (E. I. du Pont de Nemours & Co.)

For free copy circle No. 9 on postcard, p. 141

Press Brakes

A bulletin introduces a new press brake. This unit features a power brake, a power treadle and a pneumatic-electric friction clutch. The clutch and brake work together; this inches the ram down smoothly. Models come in 30- and 50-ton capacities. (Niagara Machine & Tool Works.)

For free copy circle No. 10 on postcard, p. 141

Vacuum Valves

High vacuum valves are covered in a 32-page manual. It discusses requirements imposed by high vacuum service. Often these combine with severe corrosion conditions, high temperature, vibration and other mechanical stresses, it points out. (NRC Equipment Corp.)

For free copy circle No. 11 on postcard, p. 141

Lifting Magnets

Recommending the use of aluminum-wound lifting magnets is a new bulletin. It explains how these lightweight, high lifting capacity units operate. (Dings Magnetic Separator Co.)

For free copy circle No. 12 on postcard, p. 141

Weighing Scales

Scales for weighing items and materials from 2000 mg to 100 lb are covered in a brochure. In 8 pages, it deals with 34 different models. (The Exact Weight Scale Co.)

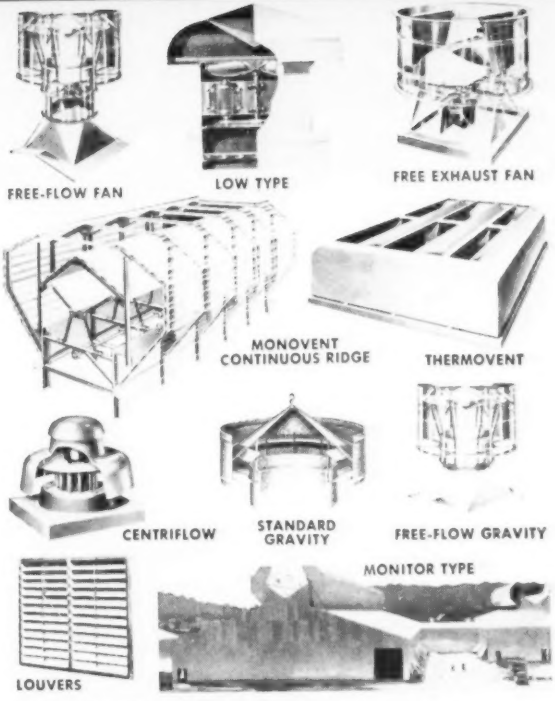
For free copy circle No. 13 on postcard, p. 141

Gas Burners

A bulletin trio gives data on gas burner components. The first describes blast type gas pilots. These

Burt

ROOF VENTILATORS
WALL LOUVERS



SEND FOR FREE DATA BOOK

BURT'S complete ventilator line includes a type and size to put air to work most efficiently and economically for your specialized needs. BURT'S engineering skill and know-how from more than half a century designing and building ventilators is your assurance of satisfaction. Your inquiry will receive prompt and qualified attention.

FAN & GRAVITY VENTILATORS LOUVERS • SHEET METAL SPECIALTIES

The Burt Manufacturing Company

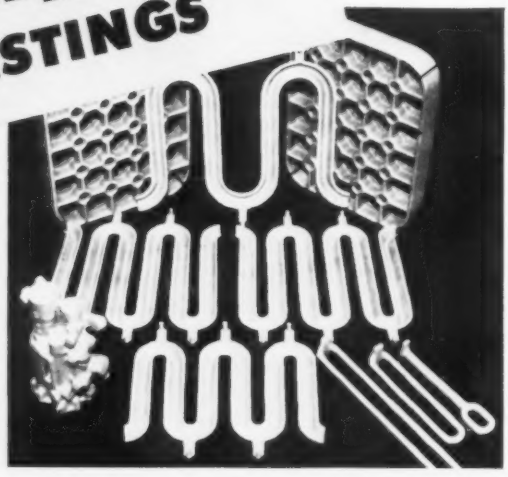
920 S. High St., Akron 11, Ohio

MEMBER POWER FAN MANUFACTURERS ASSOCIATION

Announcing

a significant broadening of
Duraloy High Alloy Casting Service...

SHELL-MOLDED CASTINGS



DURALOY

We are now in position to accept and process substantial orders for shell-molded castings in the Chrome Iron, Chrome Nickel class.

Shell-molded castings provide several values over conventional castings:
a . . . dimensions are exceptionally accurate
b . . . thinner walls are practicable
c . . . surface finish is superior

Shell-molding is ideal for mass or repetitive production of parts particularly those with intricate design.

With our conventional static and centrifugal casting service now broadened by our shell-molded casting service, we are in a better position than ever to serve industry in connection with its high alloy casting requirements. May we quote on your casting requirements that call for shell-molding?

The DURALOY Company
OFFICE AND PLANT: Scottdale, Pa.
EASTERN OFFICE 12 East 41st Street, New York 17, N. Y.
ATLANTA OFFICE 76—4th Street, N.W.
CHICAGO OFFICE 332 South Michigan Avenue
DETROIT OFFICE 23906 Woodward Avenue, Pleasant Ridge, Mich.

ignite electrically or manually. A second bulletin covers flanged gas burner nozzles, straight and elbow types. The third deals with gas burner nozzles for any of the usual fuel gases. (Hauck Mfg. Co.)
For free copy circle No. 14 on postcard, p. 141

Gas Fork Trucks

Gasoline or LPG-powered fork lift trucks outlined in a pair of bulletins come in 5000 and 6000-lb capacities. (Baker-Raulang Co.)
For free copy circle No. 15 on postcard, p. 141

Filters Fluid

Small filters, recently redesigned for 75-pct more filter area, are introduced in a data sheet. These filters now have 3.5 sq ft of filter area; yet they occupy the same floor space as previously. Here's how the filter works: Raw liquid enters its shell, passes through the tubular filter element. It cleans by reversing the flow of fluid through the filter. (R. P. Adams Co.)
For free copy circle No. 16 on postcard, p. 141

Metal Forming

Forming metal without machining is discussed in a booklet. This revised capsule version of another publication outlines basic principles of expanding, shrinking and roll forming metal without making chips, heating or destroying the metal. (For free copy write on company letterhead to Grotnes Machine Works, 5454 N. Walcott Ave., Chicago 40, Ill.)

Hydrofluoric Acid

Safe handling and use of hydrofluoric acid is stressed in a chemical safety data sheet. This 46-page booklet covers properties and essential information on both anhydrous and aqueous hydrofluoric acid. It's a revision of a 1948 safety sheet set up by the Manufacturing Chemists' Assn. (The Harshaw Chemical Co.)
For free copy circle No. 17 on postcard, p. 141

FREE LITERATURE

This section starts on Page 138.

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Power Units

A 4-page folder presents a new electric-hydraulic power unit and a new air-hydraulic power unit. (Hi-Shear Rivet Tool Co.)

For free copy circle No. 18 on postcard

Overhead Conveyor

Overhead conveyors are discussed in a folder. (Chainveyor Corp.)

For free copy circle No. 19 on postcard

Engines

A booklet shows actual installations of a firm's V-8 and V-12 diesel engines. It pictures them in action all over the world, in different situations and climates, tackling numerous jobs. (Caterpillar Tractor Co.)

For free copy circle No. 20 on postcard

Firm Profile

Products engineered for metallurgical and other industrial applications appear in a 20-page booklet. This publication gives a capsule review of a large equipment and construction firm. (Blaw-Knox Co.)

For free copy circle No. 21 on postcard

Wire Brushes

Wire brushes in virtually every shape and form are listed in a 22-page catalog. (Anderson Corp.)

For free copy circle No. 22 on postcard

Air-abrasive Cutters

High-speed gas streams and fine abrasive particles team-up to perform delicate deburring, abrading and cutting jobs with a new machine. An 8-page bulletin explains how the unit operates. The air-abrasive tool etches, drills, finishes and cuts many materials. (S. S. White Industrial Div.)

For free copy circle No. 23 on postcard

Wire Cloth

Within its 94 pages, a comprehensive catalog gives a rundown on wire cloth, screens and wire cloth products. Reviewed are: applications, types, sizes, useful metallurgical tables. (Cambridge Wire Cloth Co.)

For free copy circle No. 24 on postcard

Molding Press

Now available is a bulletin on a 25-ton automatic plastics molding press. (F. J. Stokes Corp.)

For free copy circle No. 25 on postcard

Transformer

Variable transformers appear in a folder. (Superior Electric Co.)

For free copy circle No. 26 on postcard

Liquid Locking

Liquid locking material for threaded fasteners is covered in a technical report. It describes different grades, suggests where to use them. (American Sealants Co.)

For free copy circle No. 27 on postcard

Grinding Wheels

Grinding wheels of many types appear in a company's stock list. (Simonds Worden White Co.)

For free copy circle No. 28 on postcard

Static Switching

Static switching systems are covered in a folder. It details advantages of static control with automated plant setups. (General Electric Co.)

For free copy circle No. 29 on postcard

Closing Boxes

Specially prepared for fiberboard box users is a new brochure. In 16 pages, it tells how to select the best way of sealing cartons. Several

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **7/25/57**

Circle numbers for Free Technical Literature or Information on New Equipment:

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31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60

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Page ..... Product .....

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FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD
No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE
Post Office Box 77
Village Station
NEW YORK 14, N. Y.

BUSINESS REPLY CARD

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THE IRON AGE

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NEW YORK 14, N. Y.

FIRST CLASS PERMIT No. 36 (Sec. 34.9 P.L.&R.) New York, N. Y.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **7/25/57**

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State .....

FREE LITERATURE

methods (gluing, gummed tape, stapling, etc.) are discussed. All have their advantages, it points out; all have disadvantages, too. (Acme Steel Co.)

For free copy circle No. 30 on postcard

Motor Controls

Standardized motor control centers are depicted in a 32-page booklet. These centers employ a new modular design which keeps many motor controls in a central unit. (Cutler-Hammer, Inc.)

For free copy circle No. 31 on postcard

Switches

Buttons for lighted pushbutton switches appear in a data sheet. (Micro Switch Div., Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 32 on postcard

Metal Powder

Want to know how to hurdle powdered metal parts' production stumbling blocks? A brochure suggests a way to get over many of them. It describes a new production testing service for powdered metal parts producers. (Hoeganaes Sponge Iron Corp.)

For free copy circle No. 33 on postcard

Pump Selection

Looking for a pump? Maybe this'll come in handy: It's a pump selector chart listing many models for handling fluid. Units are gasoline, electric and belt-driven. (Barnes Mfg. Co.)

For free copy circle No. 34 on postcard

Glass Items

If you have a metal product that needs, or could use, some glass components to make it look or work better, read this. It's an 8-page brochure that describes custom-made glass parts. Pictured are items of practically every type and shape. It includes lead glasses for electronics uses, parabolic floodlight reflectors, and tiny heat-resistant indicator windows for instruments. Both almost ordinary and unorthodox glass products appear. (The Lancaster Lens Co.)

For free copy circle No. 35 on postcard

Motor Starters

One firm's motor starters and contactors are described in a 12-page bulletin. These units come in sizes 4, 5 and 6 (Type 425), 50 to 400 hp. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 36 on postcard

High Speed Steel

A data sheet gives specifications of a high speed steel. The sheet analyzes its makeup, applications, heat treatment, forging, annealing, hardening, quenching, tempering, etc. (Firth Sterling, Inc.)

For free copy circle No. 37 on postcard

Industrial Engines

An engine that delivers more—pound for pound—than other units of comparable horsepower is outlined in a 4-page catalog. It describes several high-output, low-weight engines. (Fageol Products Div., Twin Coach Co.)

For free copy circle No. 38 on postcard

Surface Grinder

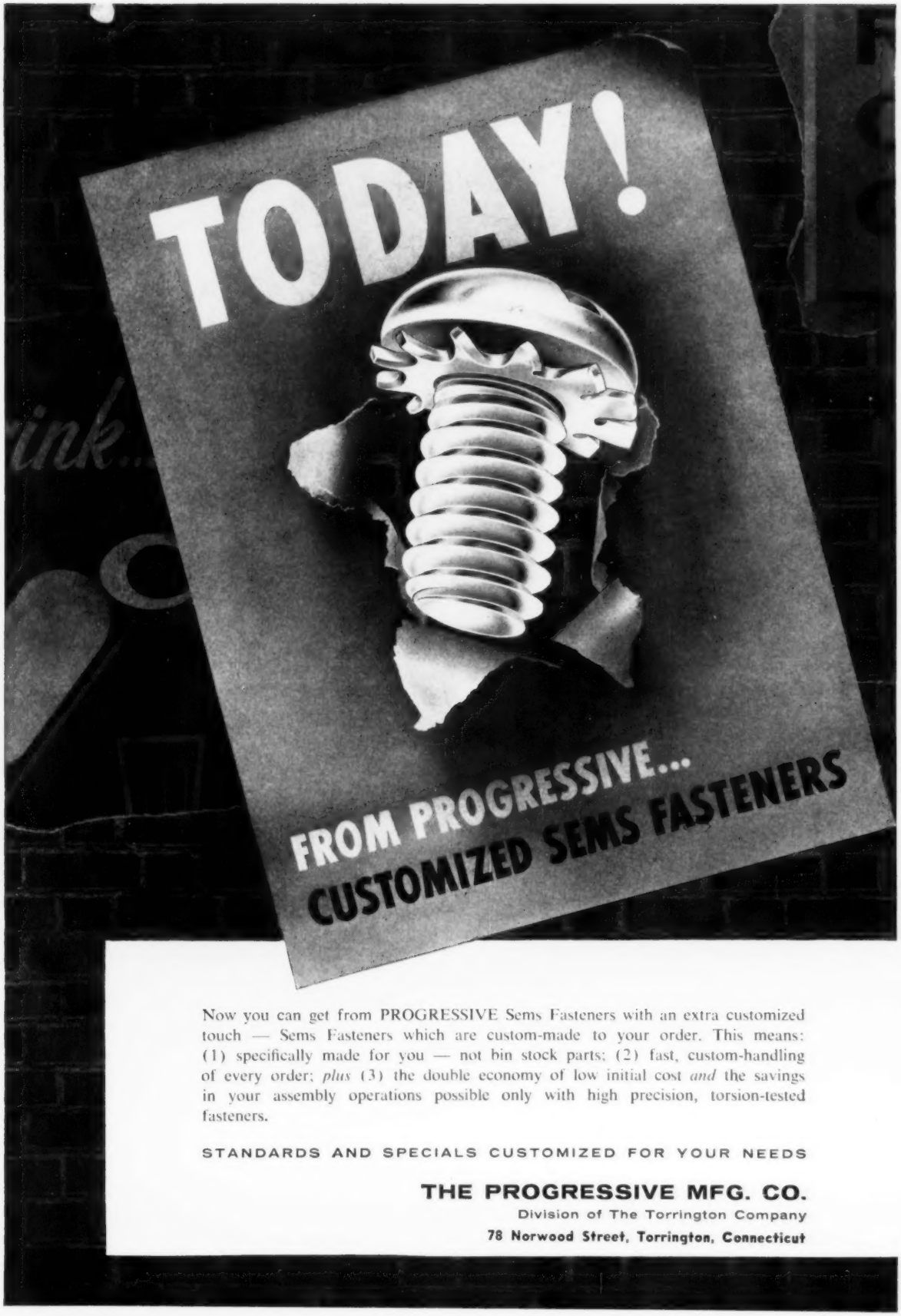
With a table working surface of 10 x 16 in., a large capacity surface grinder handles die block and toolroom work. A data sheet explains several of its features. The unit's spindle speed reaches 1750 rpm. (Covel Mfg. Co.)

For free copy circle No. 39 on postcard

Importing

Problems involved in importing materials, machines and tools from overseas are discussed in a dozen-page booklet. But it also offers a way to solve these. Briefly reviewed are the facilities of a large import company that makes this possible: you can deal with an American firm, in American terms—and still get the benefits of foreign metals and machines. (Kurt Orban Co., Inc.)

For free copy circle No. 40 on postcard



Now you can get from PROGRESSIVE Sems Fasteners with an extra customized touch — Sems Fasteners which are custom-made to your order. This means: (1) specifically made for you — not bin stock parts; (2) fast, custom-handling of every order; *plus* (3) the double economy of low initial cost *and* the savings in your assembly operations possible only with high precision, torsion-tested fasteners.

STANDARDS AND SPECIALS CUSTOMIZED FOR YOUR NEEDS

THE PROGRESSIVE MFG. CO.
Division of The Torrington Company
78 Norwood Street, Torrington, Connecticut

STEEL MEN!

Corhart melting-end bridgewall, in tank described below, after 21 months and 6 days of service . . .

WHAT IS A "CORHART BALANCED FURNACE"?

THE term "Corhart Balanced Unit" does not signify a new or unusual design of glass furnace. It is used to describe *your* furnace, just as it stands, except with the more vulnerable parts *fortified* with Corhart Electrocast to that point where *all* parts of the tank—from dog-house to bottom—wear out evenly, each part delivering its full potential of life and service.

The cost of Corhart Electrocast is higher *per ton* of blocks, but analyses of cost and results in many units prove beyond question that it is by far the most economical refractory *per ton of glass produced.* Glass factory profits are determined by the cost of *finished ware* and NOT by the cost of the tank blocks.

The following is a typical example of many actual records:

	CORHART BALANCED TANK	CLAY TANK (AVE. OF 5 FIRES)
Cost, labor and materials	$11,100.00	$8,000.00
Life (days)	648	289
Tons of glass produced	22,087	7,274
Tank cost per day	$17.12	$27.70
Tank cost per ton of glass produced	$0.503	$1.10
Melting area	18 x 32	18 x 32

With the outlook for large tonnage demand and the desirability of continuous operation, such economies as these cannot long be ignored. Corhart Electrocast is the answer to the crying demand for a better glass furnace construction material. Write today for further information and proof of economy. *Address:* Corhart Refractories Co., *Incorporated,* 16th & Lee Sts., Louisville, Ky.

CORHART ELECTROCAST REFRACTORIES

HERE'S an ad of ours that appeared 24 years ago, back when only a few of the most progressive glass manufacturers would use Corhart Electrocast Refractory —"one of the world's highest-priced refractories". Today, however, Corhart Electrocast Refractories are used extensively throughout the world . . .

In 1957, Corhart 104 is still relatively new in the steel industry. It is also "one of the world's highest-priced refractories". Yet it offers open-hearth furnace operators the same opportunities for greater production and lower costs that Corhart Electrocast brought to glass manufacturers.

May we tell you the whole Corhart 104 story? Address: Corhart Refractories Co., *Incorporated,* 1638 West Lee Street, Louisville 10, Kentucky, U.S.A. SPring 8-4471.

QUALITY ECONOMY ENDURANCE

CORHART 104 ELECTROCAST REFRACTORY

The words "Corhart" and "Electrocast" are registered Trade Marks which indicate manufacture by Corhart Refractories Company, *Incorporated.* Corhart Refractories Co., *Incorporated,* 1602 West Lee Street, Louisville 10, Kentucky, U.S.A.—Telephone SPring 8-4471

The Iron Age Summary

Have Steel Stocks Hit Bottom?

Mills see signs of a leveling off in inventory cutbacks. Optimism is growing.

Automotive and appliances are expected to be factors in fourth quarter upsurge.

▪ Major steel users may be touching bottom on inventories. The mills see indications of a delicate balance between inventories and production needs.

The apparent reduction of steel stocks to near-working levels is just one reason for growing optimism for second-half steel demand. Even usually-cautious sales managers see a definite upturn in sight for the "easier" products—hot and cold-rolled sheet.

Help From Autos — August sheet demand will be little better than July. But the tail end of August is expected to mark beginning of the upswing. Some steel men foresee a relatively tight sheet market in November and December.

These forecasts are based on an expected buildup in demand from such major users as automotive and appliances. The auto companies can't miss operating at capacity in the last quarter, says one steel maker. He adds that demand from appliance makers should begin to strengthen in September-October.

Warning To Customers — Steel men expect increased demand for sheets to affect the availability of light plate in the near future. Mills have been rolling light plate on sheet-strip mills. But as sheet demand strengthens, the rolling of these plates will be shifted to the regular plate mills. One mill already is restricting its acceptance of orders for light plate for August-September delivery.

The mills are warning their customers of the expected shift in market trends. But, so far, there is no sign of a concerted rush to place orders. This may come later, as the pattern for last half of the year takes more definite shape. The real push for tonnages may not materialize until November.

Lift For Fabricators — Fabricators of structural steel find their supply problems a bit easier this week. Wide-flange structurals and sheared plate are still hard to come by. But lighter sizes are relatively easier. And the mills are sticking closer to their delivery promises now than a few months ago.

There is little chance of an easing soon in the market for heavy structurals and plate. The mills are hard put to take care of orders on hand. And the pressure continues. But there's some hope for the future. Some mills predict that new capacity will help them balance supply with demand by the middle of 1958.

Cement Strike — The shortage of cement due to strikes is slowing down construction in some areas. But this is having little or no effect on demand for structural steel. Builders are taking in everything the mills offer.

Steel Output, Operating Rates

	This Week	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	2,087	2,048	2,228	406
Ingot Index (1947-1949=100)	129.9	127.5	138.6	25.2
Operating Rates				
Chicago	81.0	81.0	84.0	5.0
Pittsburgh	87.0	83.0*	89.0	7.0
Philadelphia	84.0	90.0	97.0	0.0
Valley	75.5	74.0*	73.5	13.0
West	103.0	99.0	104.0	25.0
Buffalo	90.0	90.0	102.0	0.0
Cleveland	75.0	78.0*	88.0	0.0
Detroit	82.0	84.0	99.0	55.0
S. Ohio River	62.0	64.0*	81.0	71.0
South	87.5	92.0	93.0	3.5
Upper Ohio R.	76.0	72.0*	83.5	55.0
St. Louis	79.0	84.0	74.0	95.0
Northeast	50.0	50.0	66.5	47.0
Aggregate	81.5	80.0	87.0	16.5

*Revised

Prices At a Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.967	5.967	5.670	5.179
Pig Iron (Gross ton)	$66.15	$64.95	$64.56	$60.61
Scrap, No. 1 hvy (Gross ton)	$53.83	$54.17	$54.83	$49.50
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	25.90
Copper, electrolytic	29.25	29.25	29.25	46.00
Lead, St. Louis	13.80	13.80	13.80	15.80
Magnesium ingot	36.00	36.00	36.00	34.50
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin, Straits, N. Y.	96.00	96.00	97.50	95.75
Zinc, E. St. Louis	10.00	10.00	10.50	13.50

Foundry Equipment Competitive

Demand from foundries is strong, but suppliers find the battle for business fierce.

Delivery of standard equipment has lengthened to about 4-8 months.

▪ A softened market for castings is nudging a good many foundries into spending some money on automation and new equipment to stay competitive. And the equipment vendors are so competitive, they will probably absorb the steel price increase temporarily.

Some foundries are doing patchwork jobs with new pieces of equipment here and there. Not quite as many are doing wholesale revamps. In the case of some high production foundries like auto and appliance parts makers, foundry equipment has become obsolete in as little as five years and complete new systems are being installed.

Volume Good — Vendor firms like C. O. Bartlett & Snow of Cleveland which install complete conveying and conditioning equipment, are finding the going very competitive. But the annual volume is not too far off last year's. C. O. Bartlett, vice president and sales director, said that lead times are still from 9 months to a year on system installations. Individual pieces of standardized equipment like slingers and mullers can be had in three months.

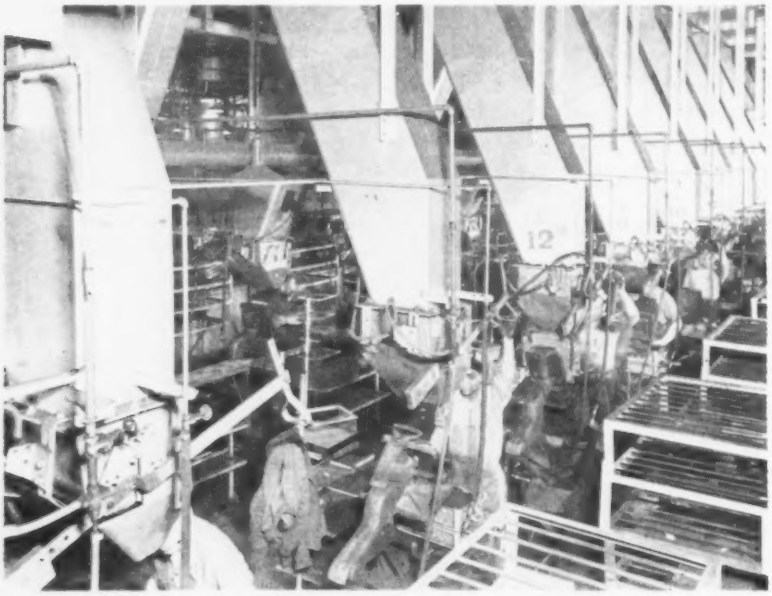
One major Ohio foundry equipment supplier seems to be running way ahead of the field with volume at mid-year already double last year's total. This firm specializes in standard foundry equipment of varying size. The demand is steady but competition so fierce that the steel price increases will be absorbed, according to an official.

Replacement Scope Varies — Limiting factor, here too, is designing the special equipment and handling systems to carry the materials between standard types of production equipment. The pattern of new installations is also ranging from a conservative replacement of a few obsolete machines to a sweeping revamp of an entire installation. It generally hangs on what the competition is doing, how good the firm's credit is and how courageous the management.

Quality control measures are also on the increase in line with the general upgrading going on in the industry. The progressive foundries are pouring profits back into the business. And quality control is becoming a more potent sales tool. So delivery of standard production equipment is now about 4-8 months. This has lengthened from the about 3-5 months being quoted in January.

Handling Equipment Factor — In many cases the standardized equipment is available much sooner than the materials handling and other systems servicing it which are custom built. These are all specially designed and adapted to deliver certain grades of material at a specified rate. In a general mechanization program the engineering, designing and securing of bids on this type of equipment still generally take up to 6 months and the complete installation 3 to 4 months.

Some firms supplying auxiliary equipment are backing out of the foundry supply field.

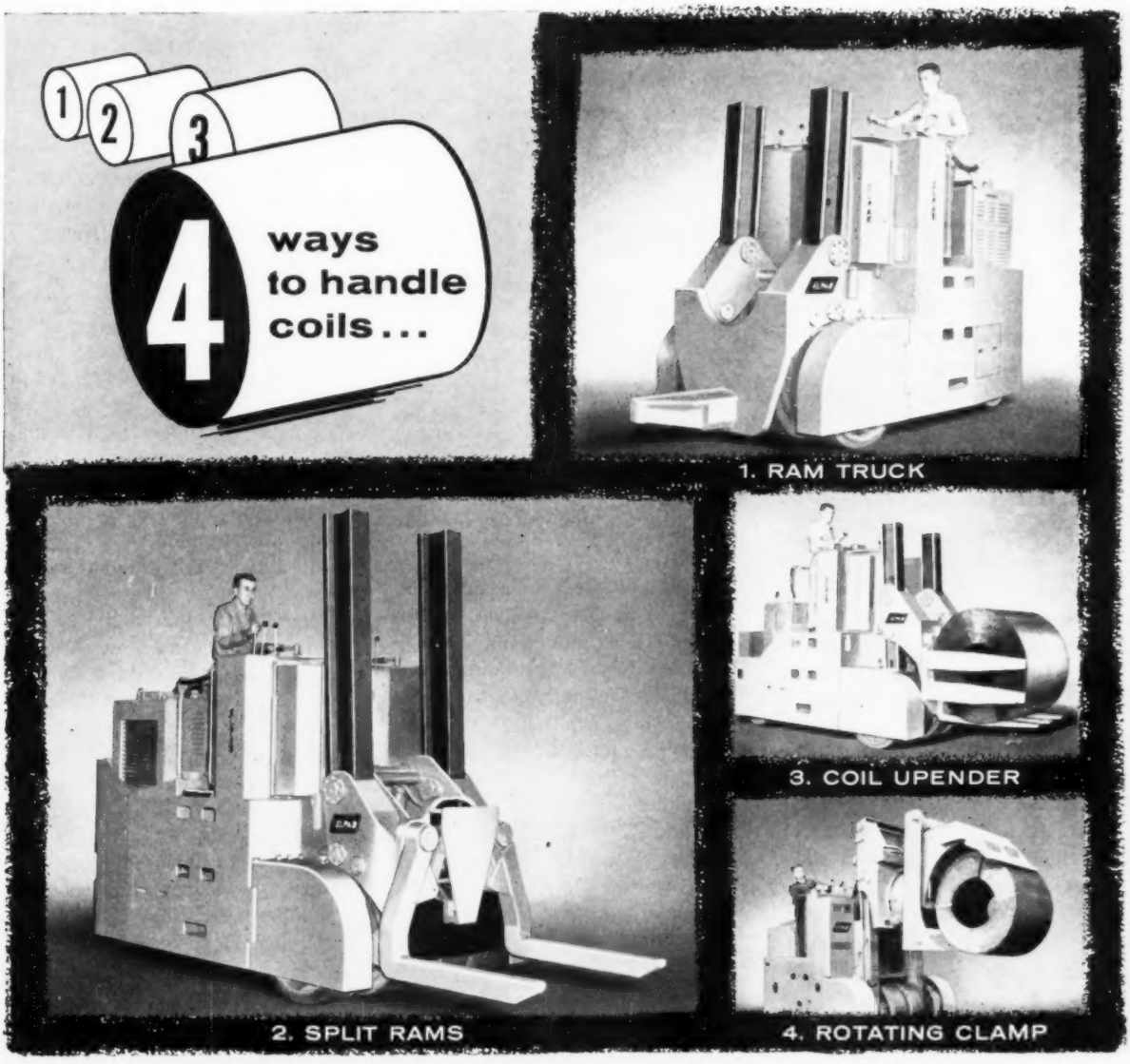


COMPETITION: Foundry equipment suppliers, like Bartlett & Snow Co., Cleveland, say demand is good, but the battle for business is fierce.

Prices

Jones & Laughlin Steel Corp. increased prices, effective July 16, for its steel shipping pails. The increase averaged 7 pct.

Industrial Brownhoist Corp., Bay City, Mich., advanced price of repair parts shipped after July 12.



4 Reasons Why ELPAR Remains Top Choice in Steel Trucks

1. ELPAR RAM TRUCKS—"Old Reliable" with more new features. Dual drive motors, picture-window vision, power hydraulic brakes, dual controls, power steer—these are a few of the plus values that make ELPAR heavy-duty ram trucks the most efficient ever built. Continual design improvement keeps them the standard for the industry.

2. SPLIT RAMS—double-duty coil handling. Handle twice as many coils in the same time. Hydraulically-operated rams can be spread to handle two coils abreast . . . or brought together for single-ram-truck operation.

3. UPENDER—quick coil turnover. ELPAR truck with rotating forks upends and down-ends multi-ton coils with effortless ease. It speeds production operations and eliminates the need for stationary upenders.

4. ROTATING CLAMP—precise coil placement. Hydraulic clamp truck picks up and deposits coils horizontally or vertically... makes it possible to feed coils to equipment in the exact position required.

Benefit from Elwell-Parker's 50 years of steel industry experience. Learn how ELPAR trucks and attachments can cut your multi-ton loads down to manageable size . . .

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Sheet Buyers Get Order Warning

Although market is dragging its feet, mills urge customers to get Fall orders in as early as possible.

Some feel pickup in demand might mean a supply pinch by November or December.

■ "Get Fall sheet orders on the books early." That's the warning some mill salesmen are giving their customers. And despite the current stagnant condition of the market, there's logic in their suggestion.

August sheet ordering is moving at a better pace than did July's. Automotive buyers are getting increasingly active. Even conservative mill men are talking about a sheet ordering upswing in August and September. And in some quarters it's felt a real supply pinch might develop in the last two months of the year.

As the auto lines start to turn out the '58 models sheet demand will heighten. And while the appliance makers are currently gloomy about third quarter steel buying, any real sales spurt could bring them back into the market fast. Even now, production is lagging behind sales and inventories are low.

Sheet and Strip—Current ordering pace indicates August will be a better sales month for the mills than was July. And opinion favors a gradual market improvement beginning next month and extending through September.

At the moment galvanized sheets are particularly poor with mill inventories high and orders low.

Some increased orders for h-r and c-r sheet for August and September are pepping up the **Cleveland** market to a degree. However, while auto plants are plugging inventory holes, appliance makers are revising downward their third quarter sheet requirements.

Aluminum coated sheet from **Pittsburgh** area is moving well in the Midwest. It's much in demand by picnic broiler and barbeque makers.

Eastern producers in the **Philadelphia** area say August orders for hot- and cold-rolled sheet are better than July's, but still slow.

Plates and Shapes—Market supply and demand are showing a little better balance although mills still have plenty of orders for heavy plate and wide flange beams. Products easier to obtain include universal mill plate, strip mill plate, and bar size angles.

Pittsburgh area mills find demand still strong for heavy plate, sheared plate, and wide flange sections.

One **Philadelphia** producer sees the market the same way. Another indicates that third quarter allotments for sheared mill plate, which were previously gobbled up in a couple of days, are still not all spoken for. Same mill says standard structurals are displaying some lack of market appeal.

A **Cleveland** area sheet mill has agreed to take orders for light plate for August delivery. Other producers there are quoting the same product for no earlier than September or October delivery.

Standard structurals are easing on the **West Coast.** Steady shipments from the East are helping fabricators move along on important jobs.

Bars—Demand for carbon bars is off. Producers look for a slight improvement in shipments in August.

As an example of the market's weakness, **West Coast** mills report merchant bars have dropped from six to four weeks in delivery time, reinforcing bars require only a week's time.

Pig Iron—Other producers—including Interlake Iron, Granite City Steel, U. S. Steel, Crucible Steel, Tonawanda Iron Div., Shenango Furnace, and Republic Steel—have advanced pig iron prices. (New prices appear in table opposite.)

Steel Market At A Glance

	Delivery Promises Pittsburgh	Chicago	Cleveland	Detroit	East	West Coast
CR Carbon Sheet	2-5 wks	2-4 wks	4 wks	6-8 wks	2-6 wks	Quota
HR Carbon Sheet	2-3 wks	2-4 wks	4 wks	4-6 wks	1-3 wks	Quota
CR Carbon Strip	2-6 wks		3 wks	6-7 wks		4-6 wks
HR Carbon Strip	2-3 wks		3 wks	4-6 wks	1-3 wks	10 wks
HR Carbon Bars	2-3 wks	2-4 wks	3-4 wks	4-6 wks	2-4 wks	4 wks
CF Carbon Bars	2-6 wks	1-2 wks	2 wks	2-4 wks	2-3 wks	4 wks
Heavy Plate	Quota	Quota			Quota	Quota
Light Plate	2-4 wks	3-4 wks	5-6 wks		2-4 wks	Quota
Merchant Wire	1-2 wks	1-3 wks	2 wks		1-2 wks	4 wks
Oil Country Goods	8 wks up		Quota		Quota	
Linepipe	Quota		Quota		Quota	4th Q.
Buttweld Pipe	1 wk		3 wks	2-3 wks	1-2 wks	4-5 wks
Structurals	Quota	3-4 wks		10-12 wks	2-4 wks	8 wks
CR Stainless Sheet			3-4 wks	2-3 wks	3-4 wks	
CR Stainless Strip			3-4 wks	2-3 wks	3-6 wks	

COMPARISON OF PRICES

(Effective July 23, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	July 23 1957	July 16 1957	June 25 1957	July 24 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.925¢	4.925¢	4.675¢	4.325¢
Cold-rolled sheets	6.05	6.05	5.75	5.325
Galvanized sheets (10 ga.)	6.60	6.60	6.30	5.85
Hot-rolled strip	4.925	4.925	4.675	4.325
Cold-rolled strip	7.17	7.17	6.870	6.28
Plate	5.12	5.12	4.87	4.52
Plates, wrought iron	13.15	13.15	10.40	10.40
Stainl's C-R strip (No. 302)	52.00	52.00	50.00	44.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.30	$10.30	$10.30	$9.85
Tin plates, electro (0.50 lb.)	9.00	9.00	9.00	8.55
Special coated mfg. ternes	9.55	9.55	9.55	9.10
Bars and Shapes: (per pound)				
Merchant bars	5.425¢	5.425¢	5.075¢	4.65¢
Cold finished bars	7.30	7.30	6.85	5.90
Alloy bars	6.475	6.475	6.125	5.65
Structural shapes	5.275	5.275	5.00	4.60
Stainless bars (No.302)	45.00	45.00	43.25	38.25
Wrought iron bars	14.45	14.45	11.50	11.50
Wire: (per pound)				
Bright wire	7.65¢	7.65¢	7.20¢	6.60¢
Rails: (per 100 lb.)				
Heavy rails	$5.525	$5.525	$5.275	$4.725
Light rails	6.50	6.50	6.25	5.65
Semifinished Steel: (per net ton)				
Rerolling billets	$77.50	$77.50	$74.00	$68.50
Slabs, rerolling	77.50	77.50	74.00	68.50
Forging billets	96.00	96.00	91.50	84.50
Alloy blooms, billets, slabs	114.00	114.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	6.15¢	6.15¢	5.80¢	5.025¢
Skelp	4.875	4.875	4.625	4.225
Finished Steel Composite: (per pound)				
Base price	5.967¢	5.967¢	5.670¢	5.179¢

	July 23 1957	July 16 1957	June 25 1957	July 24 1956
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.38	$70.38	$68.88	$66.51
Foundry, Valley	66.50	65.00	65.00	60.50
Foundry, Southern Cin'ti	70.67	67.17	67.17	62.93
Foundry, Birmingham	62.50	61.33	59.00	57.67
Foundry, Chicago	66.50	65.00	65.00	63.00
Basic, del'd Philadelphia	69.88	69.88	68.38	65.75
Basic, Valley furnace	66.00	64.50	64.50	60.00
Malleable, Chicago	66.50	65.00	65.00	63.00
Malleable, Valley	67.00	65.00	65.00	60.50
Ferromanganese, cents per lb‡ 74 to 76 pct Mn base.	12.75¢	12.75¢	12.75¢	9.50¢
Pig Iron Composite: (per gross ton)				
Pig iron	$66.15	$64.95	$64.56	$60.61
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$56.50	$56.50	$56.50	$50.50
No. 1 steel, Phila. area	*53.50*	54.50	56.50	51.50
No. 1 steel, Chicago	51.50	51.50	51.50	46.50
No. 1 bundles, Detroit	48.50	48.50	46.50	41.50
Low phos., Youngstown	57.50	56.50	56.50	54.50
No. 1 mach'y cast, Pittsburgh	58.50	58.50	57.50	54.50
No. 1 mach'y cast, Philadel'a	56.50	56.50	56.50	54.50
No. 1 mach'y cast, Chicago	52.50	50.50	51.50	49.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$53.83*	$54.17	$54.83	$49.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$14.50
Foundry coke, prompt	$17.50-$19	$17.50-$19	$17.50-$19	$17.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	29.25	29.25	29.25	46.00
Copper, Lake, Conn.	29.25	29.25	29.25	46.00
Tin, Straits, N. Y.	*96.00†*	96.00	97.50	95.75
Zinc, East St. Louis	10.00	10.00	10.50	13.50
Lead, St. Louis	13.80	13.80	13.80	15.80
Aluminum, virgin ingot	27.10	27.10	27.10	25.90
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	34.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. • Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producer see Key on P. 160→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	
Birmingham *R3*	62.00	62.50*			
Birmingham *W9*	62.00	62.50*	66.50		
Birmingham *U4*	62.00	62.50*	66.50		
Buffalo *R5*	66.00	66.50	67.00	67.50	
Buffalo *H1*	66.00	66.50	67.00	67.50	
Buffalo *W6*	66.00	66.50	67.00	67.50	
Chester *P2*	66.50	67.00	67.50		
Chicago *I4*	66.00	66.50	66.50	67.00	
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R5*	66.00	66.50	66.50	67.00	
Duluth *I6*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	66.50	67.00	67.50		
Fontana *K1*	72.50	73.00			
Geneva, Utah *C7*	66.00	66.50			
Granite City *G2*	67.90	68.40	68.90		
Hubbard *Y1*			65.00		
Ironton, Utah *C7*	66.00	66.50			
Midland *C11*	66.00				
Minnequa *C6*	66.50	67.00	67.50		
Monessen *P6*	64.50				
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*		66.50	67.00	67.50	
Sharpsville *S5*	66.00	66.50	67.00	67.00	
So. Chicago *R3*	66.00	66.50	66.50		
So. Chicago *W8*	66.00		66.50	67.00	
Swedeland *A2*	68.00	68.50	69.00	69.50	
Toledo *I4*	66.00	66.50	66.50	67.00	
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	74.00
Youngstown *Y1*			65.00	65.50	

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. * Add $1.00 for 0.31 0.69 pct phos. † Intermediate low phos. ‡ Add $1.00 for 0.31 to 0.50 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $78.50; Jackson, *J1*, *I4* (Globe Div., $77.25; Niagara Falls (15.01 15.50), $101.00; Keokuk (14.01 14.50), $103.50; (15.51 16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery to 18 pct.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.00	23.75	23.25	25.25	—	27.00	39.75	32.25	37.00	—	16.75	—	17.00
Slabs, billets	27.00	27.00	28.00	31.50	32.00	33.25	49.50	40.00	46.50	—	21.50	—	21.75
Billets, forging	—	36.50	—	38.00	41.00	40.50	62.25	47.00	55.75	32.00	28.25	28.75	28.75
Bars, struct.	42.00	43.00	44.25	45.00	48.00	47.75	73.00	55.50	64.75	37.75	33.75	34.25	34.25
Plates	44.25	45.00	46.25	47.25	—	50.75	76.75	59.75	69.75	40.25	35.00	—	36.00
Sheets	48.50	49.25	51.25	52.00	—	55.50	81.50	65.50	79.25	—	40.25	—	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	—	55.50	81.50	65.50	79.25	48.25	40.25	—	40.75
Wire CF; Rod HR	—	40.75	42.00	42.75	45.75	45.50	69.50	52.50	61.50	36.00	32.25	32.75	32.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W1*, *J2* Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown, *C5*, Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1*; New Bedford, Mass. (.25¢ per lb higher), *R6*; Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa. *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*; Gary *U1*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7* Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3* Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse *C11*; Detroit *R5*; Munhall, Pa., S. Chicago, *U1*.

Summer Scrap Lull Is Misleading

Particularly in the Midwest, lack of buying doesn't indicate softness.

Mills may be holding off making commitments until own sales pattern firms.

▪ Don't interpret the summer quiet that prevails in most markets as weakness. In spite of the absence of major activity, there is evidence of strength.

Exception is the East Coast, where a slack in export and low mill action combined to bring down the market in recent weeks.

In some markets turnings are beginning to build up at the dealer level. There is less pressure on blast furnaces with the summer easing of the steel operating rate with resulting easing of turnings demand.

Mills are apparently watching their own sales pattern before buying heavily.

There is also some evidence that mills are unwilling to tie up a lot of money in inventory—an extension of the tight money situation. The same may be true of dealers, although both mills and dealers believe the market will have to go up in late summer or early fall.

Whatever the reason, mill inventories are not high and there is no eagerness to rebuild them at the moment. Nor are dealer stocks high. In Pittsburgh, dealer stocks are estimated to be no larger than 100,000 tons.

Following the decline in the East, The IRON AGE Composite Price slipped to $53.83, down from $54.17 a week ago.

Pittsburgh — Prices are unchanged in a quiet market. One major consumer has placed no new orders for openhearth grades this month. Another bought only a small tonnage of secondary grades. Expired orders have not yet been cancelled, but are reported about 90 pct covered. The market is firm despite lack of mill buying. Dealers are resisting pressure for lower prices. Total dealer stocks are estimated at no more than 100,000 tons.

Chicago—The market took on a firmer tone this week. But in the absence of sales, dealer heavy melting grades were unchanged. Factory bundles, however, moved up $1 on the basis of a sale. The feeling is that the present firming is a forerunner of higher prices. Apparently the mills are hesitating to get into the market until their own sales outlook develops a more definite pattern. Blast furnace grades were up $1, and most railroad grades advanced from $1 to $3. No. 1 machinery cast rose $1, while cast iron brake shoes were up $1.

Philadelphia—This market continues to soften in what one broker describes as an "exceptionally quiet" summer. Although operating rates are fairly high, mills appear uninterested in buying scrap for the time being. And export commitments for the remainder of the month already are filled. Many brokers and dealers show willingness to unload steelmaking grades at at least $1 below last week's prices. The weakness is reflected in lower prices for most other grades.

New York—Domestic market is at a standstill. But scrap generation is also off and dealers are able to sell what they are taking in for export.

Detroit—A brief flurry of buying hit the market late last week with two mills buying token tonnages of No. 2 heavy melting at well over last quoted prices. Special quality demanded accounted for some of the high price level. This week there is some buying of No. 2 bundles.

Cleveland—The market resumed its climb as a Valley mill bought No. 1 dealer heavy melting for $57 and factory bundles for $58. Dealers continue to hang onto their scrap in hope of a better price.

St. Louis—Pressure from outside markets drawing scrap from St. Louis has strengthened the market here. Some prices are up, including primary steelmaking grades and turnings.

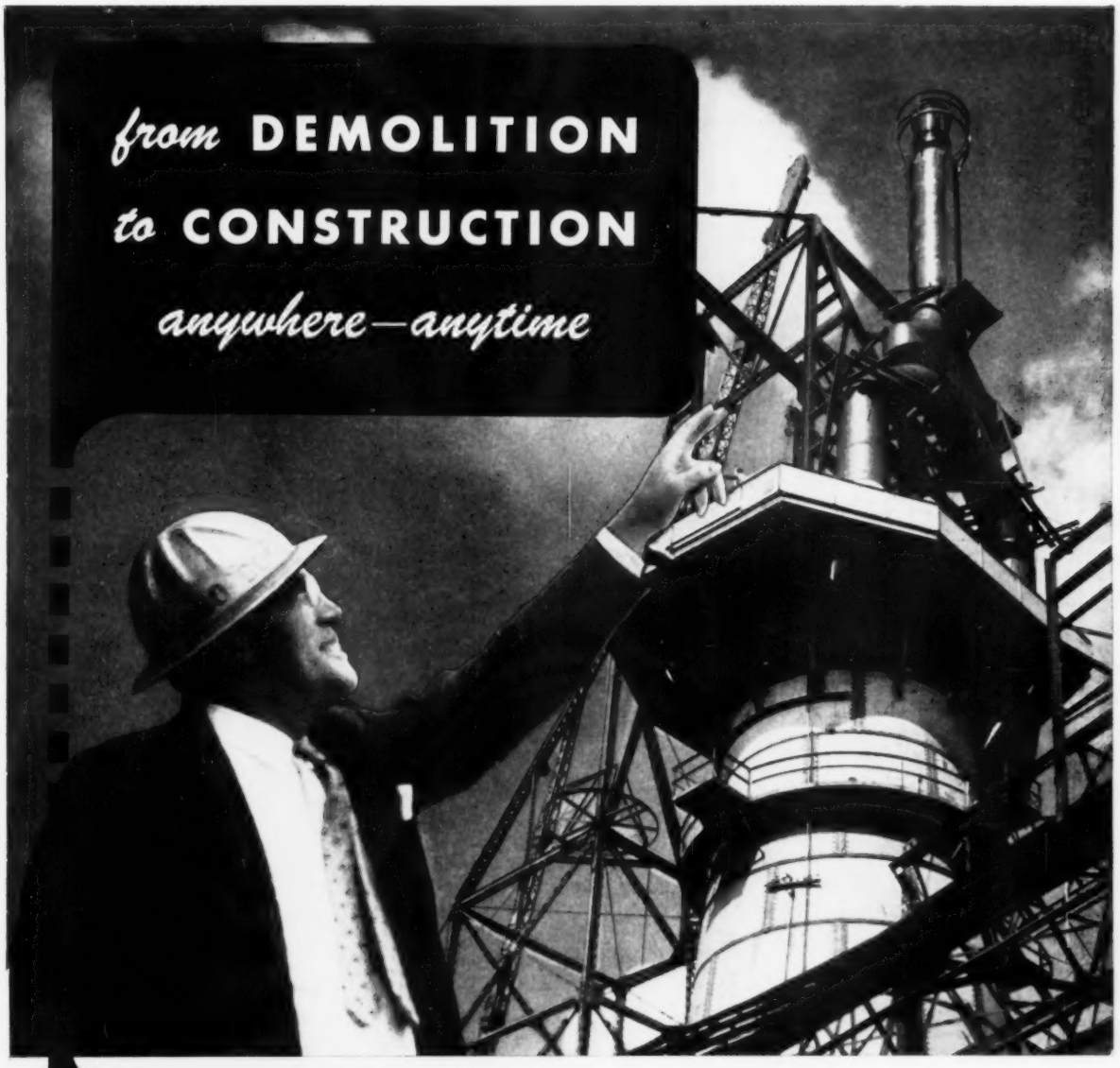
Birmingham — The market in this district is stronger for steel scrap and cast prices continue steady. An Atlanta mill has increased its price $2 per ton for No. 2 heavy melting. Another mill that held up shipments two weeks ago released them this week.

Cincinnati—The market future is largely speculative. Dealer inventories are low but so is demand. An area railroad list went for about the same price as last month.

Buffalo—The market continues quiet with no major purchases. One mill made small token purchases but not in sufficient quantity to affect prices.

Boston — No. 2 steelmaking grades are off $1 to $2 in a downward adjustment. The market is slow with both domestic and export demand off.

West Coast—The market is in a state of flux. Exporting is at a standstill with the Japanese short of credit, but with reported 90-day inventories. Collections are low.



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No construction or demolition job is too small, too involved. The reason: Experienced men like H. D. Putnam, Vice President in charge of field operations.

Putt is highly respected for his experience and ability to evaluate a situation, to determine what has to be done, then quickly and efficiently coordinate the men and equipment to complete the job.

Whatever the problem . . . from a one-man repair job to a major construction project . . . where time (as well as budget) is of prime importance . . . remember the firm that is comprised of men like H. D. "Putt" Putnam.

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THE EDWARD GRAY CORPORATION
FORMERLY CHICAGO CONCRETE BREAKING CO.

213 COREY AVENUE, BRADDOCK, PA.
TELEPHONE ELECTRIC 1-1656

SCRAP PRICES *(Effective July 23, 1957)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$56.00 to $57.00
No. 2 hvy. melting	49.00 to 50.00
No. 1 dealer bundles	56.00 to 57.00
No. 1 factory bundles	62.00 to 63.00
No. 2 bundles	46.00 to 47.00
No. 1 busheling	56.00 to 57.00
Machine shop turn.	33.00 to 34.00
Mixed bor. and ms. turn.	33.00 to 34.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	37.00 to 38.00
Low phos. punch'gs plate	62.00 to 63.00
Heavy turnings	50.00 to 51.00
No. 1 RR. hvy. melting	64.00 to 65.00
Scrap rails, random lgth.	72.00 to 73.00
Rails 2 ft and under	75.00 to 76.00
RR. steel wheels	71.00 to 72.00
RR. spring steel	71.00 to 72.00
RR. couplers and knuckles	71.00 to 72.00
No. 1 machinery cast	58.00 to 59.00
Cupola cast	49.00 to 50.00
Heavy breakable cast	47.00 to 48.00

Chicago

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 dealer bundles	52.00 to 53.00
No. 1 factory bundles	58.00 to 59.00
No. 2 bundles	41.00 to 42.00
No. 1 busheling	51.00 to 52.00
Machine shop turn.	33.00 to 34.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	35.00 to 36.00
Low phos. forge crops	63.00 to 64.00
Low phos. punch'gs plate	59.00 to 60.00
Low phos. 2 ft and under	56.00 to 57.00
No. 1 RR. hvy. melting	59.00 to 60.00
Scrap rails, random lgth.	72.00 to 73.00
Rerolling rails	79.00 to 80.00
Rails 2 ft and under	77.00 to 78.00
Locomotive tires cut	63.00 to 64.00
Cut bolsters & side frames	64.00 to 65.00
Angles and splice bars	67.00 to 68.00
RR. steel car axles	81.00 to 82.00
RR. couplers and knuckles	61.00 to 62.00
No. 1 machinery cast	52.00 to 53.00
Cupola cast	47.00 to 48.00
Heavy breakable cast	44.00 to 45.00
Cast iron brake shoe	48.00 to 49.00
Cast iron wheels	53.00 to 54.00
Malleable	61.00 to 62.00
Stove plate	44.00 to 45.00
Steel car wheels	63.00 to 64.00

Philadelphia Area

No. 1 hvy. melting	$53.00 to $54.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 dealer bundles	53.00 to 54.00
No. 2 bundles	44.00 to 45.00
No. 1 busheling	53.00 to 54.00
Machine shop turn.	35.00 to 36.00
Mixed bor. short turn.	36.00 to 37.00
Cast iron borings	36.00 to 37.00
Shoveling turnings	38.00 to 39.00
Clean cast, chem. borings	38.00 to 39.00
Low phos. 5 ft and under	58.00 to 59.00
Low phos. 2 ft and under	59.00 to 60.00
Low phos. punch'gs	59.00 to 60.00
Elec. furnace bundles	57.00 to 58.00
Heavy turnings	49.00 to 50.00
RR. steel wheels	65.00 to 66.00
RR. spring steel	65.00 to 66.00
Rails 18 in. and under	71.00 to 72.00
Cupola cast	47.00 to 48.00
Heavy breakable cast	52.00 to 53.00
Cast iron car wheels	57.00 to 58.00
Malleable	61.00 to 62.00
Unstripped motor blocks	41.00 to 42.00
No. 1 machinery cast	56.00 to 57.00

Cleveland

No. 1 hvy. melting	$53.00 to $54.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 dealer bundles	53.00 to 54.00
No. 1 factory bundles	55.00 to 56.00
No. 2 bundles	43.00 to 44.00
No. 1 busheling	53.00 to 54.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and turn.	26.00 to 27.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Cut struct'r'l & plates, 2 ft & under	60.00 to 61.00
Drop forge flashings	53.00 to 54.00
Low phos. punch'gs, plate	54.00 to 55.00
Foundry steel, 2 ft & under	55.00 to 56.00
No. 1 RR. heavy melting	57.00 to 58.00
Rails 2 ft and under	73.00 to 74.00
Rails 18 in. and under	74.00 to 75.00
Railroad grate bars	35.00 to 36.00
Steel axle turnings	33.00 to 34.00
Railroad cast	56.00 to 57.00
No. 1 machinery cast	55.00 to 56.00
Stove plate	50.00 to 51.00
Malleable	62.00 to 63.00

Youngstown

No. 1 hvy. melting	$56.00 to $57.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 dealer bundles	56.00 to 57.00
No. 2 bundles	44.00 to 45.00
Machine shop turn.	27.00 to 28.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	30.00 to 31.00
Low phos. plate	57.00 to 58.00

Buffalo

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	39.00 to 40.00
No 1 busheling	45.00 to 46.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	28.00 to 29.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	31.00 to 32.00
Low phos. plate	52.00 to 53.00
Scrap rails, random lgth.	56.00 to 57.00
Rails 2 ft and under	66.00 to 67.00
RR. steel wheels	53.00 to 54.00
RR. spring steel	49.00 to 50.00
RR. couplers and knuckles	49.00 to 50.00
No. 1 machinery cast	50.00 to 51.00
No. 1 cupola cast	45.00 to 46.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$48.00 to $49.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	36.00 to 37.00
No. 1 busheling	48.00 to 49.00
Drop forge flashings	47.00 to 48.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	29.00 to 30.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. punch'gs plate	48.00 to 49.00
No. 1 cupola cast	48.00 to 49.00
Heavy breakable cast	44.00 to 45.00
Stove plate	45.00 to 46.00
Automotive cast	54.00 to 55.00

St. Louis

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	38.00 to 39.00
Machine shop turn.	31.00 to 32.00
Cast iron borings	33.00 to 34.00
Shoveling turnings	33.00 to 34.00
No. 1 RR. hvy. melting	58.00 to 59.00
Rails, random lengths	66.00 to 67.00
Rails 18 in. and under	73.00 to 74.00
Locomotive tires uncut	59.00 to 60.00
Angles and splice bars	62.00 to 63.00
Std. steel car axles	72.00 to 73.00
RR. specialties	62.00 to 63.00
Cupola cast	45.00 to 46.00
Heavy breakable cast	41.00 to 42.00
Cast iron brake shoes	43.00 to 44.00
Stove plate	43.50 to 44.50
Cast iron car wheels	49.00 to 50.00
Rerolling rails	73.00 to 74.00
Unstripped motor blocks	40.00 to 41.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	42.00 to 43.00
No. 2 bundles	35.00 to 36.00
No. 1 busheling	42.00 to 43.00
Elec. furnace, 3 ft & under	47.00 to 48.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and short turn.	29.00 to 30.00
Shoveling turnings	28.00 to 29.00
Clean cast, chem. borings	31.00 to 32.00
No. 1 machinery cast	40.00 to 41.00
Mixed cupola cast	33.00 to 34.00
Heavy breakable cast	42.00 to 43.00
Stove plate	32.00 to 33.00
Unstripped motor blocks	31.00 to 32.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$50.00 to $51.00
No. 2 hvy. melting	40.00 to 41.00
No. 2 dealer bundles	39.00 to 40.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Clean cast, chem. borings	34.00 to 35.00
No. 1 machinery cast	46.00 to 47.00
Mixed yard cast	41.00 to 42.00
Charging box cast	46.00 to 47.00
Heavy breakable cast	46.00 to 47.00
Unstripped motor blocks	33.00 to 34.00

Birmingham

No. 1 hvy. melting	$49.00 to $50.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	49.00 to 50.00
No. 2 bundles	37.00 to 38.00
No. 1 busheling	49.00 to 50.00
Machine shop turn.	36.50 to 37.50
Shoveling turnings	37.50 to 38.50
Cast iron borings	28.00 to 29.00
Electric furnace bundles	51.00 to 52.00
Elec. furnace, 3 ft & under	48.00 to 49.00
Bar crops and plate	55.00 to 56.00
Structural and plate, 2 ft	55.00 to 56.00
No. 1 RR. hvy. melting	55.00 to 56.00
Scrap rails, random lgth	59.00 to 60.00
Rails, 18 in. and under	65.00 to 66.00
Angles & splice bars	60.00 to 61.00
Rerolling rails	75.00 to 76.00
No. 1 cupola cast	53.00 to 54.00
Stove plate	33.00 to 34.00
Charging box cast	34.00 to 35.00
Cast iron car wheels	46.00 to 47.00
Unstripped motor blocks	44.00 to 45.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	42.00 to 44.00
No. 1 dealer bundles	51.00 to 52.00
No. 2 bundles	41.00 to 42.00
Machine shop turn.	32.00 to 33.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	30.00 to 31.00
Low phos. 18 in. & under	56.00 to 57.00
Rails, random lengths	62.00 to 63.00
Rails, 18 in. and under	71.00 to 72.00
No. 1 cupola cast	45.00 to 46.00
Hvy. breakable cast	43.00 to 44.00
Drop broken cast	55.00 to 56.00

San Francisco

No. 1 hvy. melting	$48.00 to $49.00
No. 2 hvy. melting	45.00 to 47.00
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	36.00 to 38.00
Machine shop turn.	32.00
Cast iron borings	32.00
No. 1 RR. hvy. melting	48.00
No. 1 cupola cast	55.00

Los Angeles

No. 1 hvy. melting	$48.00 to $50.00
No. 2 hvy. melting	48.00
No. 1 dealer bundles	45.00
No. 2 bundles	38.00
Machine shop turn.	33.00
Shoveling turnings	35.00
Cast iron borings	33.00
Elec. furn. 1 ft and under (foundry)	61.00
No. 1 RR. hvy. melting	48.00 to 50.00
No. 1 cupola cast	54.00

Seattle

No. 1 hvy. melting	$47.00 to $49.00
No. 2 hvy. melting	43.00 to 45.00
No. 2 bundles	30.00 to 32.00
No. 1 cupola cast	47.00
Mixed yard cast	47.00

Hamilton, Ont.

No. 1 hvy. melting	$45.00
No. 2 hvy. melting	40.00
No. 1 dealer bundles	45.00
No. 2 bundles	34.00
Mixed steel scrap	42.00
Busheling	36.00
Bush., new fact., prep'd	45.00
Bush., new fact., unprep'd	39.00
Machine shop turn.	22.00
Short steel turn.	30.00
Mixed bor. and turn.	24.00
Rails rerolling	56.00
Cast scrap	52.00

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Lead and Zinc Bills Stall in Congress

Two Senate committees, and one House group hold open hearings on lead-zinc.

Outlook is for tough barter regulations to be continued, almost no chance for any legislative help.

■ Domestic lead and zinc producers are getting a lot of verbal action in Congress these days.

Late last week the Senate Agriculture Committee aired the barter program, concentrating on the swapping of surplus farm products for lead and zinc.

Early this week the Senate Finance Committee under Sen. Harry F. Byrd (D., Va.), considered the Administration's proposals for a sliding scale tariff to support the domestic lead-zinc industry.

And on Aug. 1 and 2, the House Ways and Means Committee will hold public hearings in an attempt to expedite legislation supporting the U. S. lead-zinc industry (IRON AGE, July 18, p. 176).

No Barter Change—At the Agriculture hearings, domestic producers were disappointed. It has been generally conceded, everywhere but at high levels in the Agriculture Dept., that the new approach to barter is almost unworkable. The industry had hoped soft words would be spoken, indicating a quiet, unpublicized, even unofficial relaxing of some of the new rules.

Instead, Walter C. Berger, administrator, Commodity Stabilization Service, the agency in charge of barter, said the department was opposed to barter as a method of finding lucrative markets for metals. The CSS will only barter, said Berger, when it will mean the export of more agricultural goods than would have been shipped without barter.

Senators Speak — The industry got more encouragement at the Finance Committee hearings. But the speakers were a group of mining states senators, and representatives of various segments of the U. S. industry and labor.

And, no matter what is decided here, nothing can be done until the House Ways and Means Committee recommends a bill, and it passes the House.

Under normal conditions the Finance Committee meeting might be helpful in speeding legislation. Despite the log jam of bills before House Ways and Means Committee, it now appears that enough weight can be swung behind the Administration's proposals for sliding scale tariffs to get the bill to the floor. The identical bill has been introduced in the Senate by Sen. Arthur Watkins (R., Ut.), and is before the Finance Committee now.

No Action Expected—But, congressional observers say it is just too late for simultaneous committee debate to speed things up enough. Because of the Civil Rights Bill controversy, a lead and zinc bill can not get action in the Senate, regardless of what progress is made in the House. And current hearings are of little more value than putting various senators and congressmen on the record.

Copper

Custom smelter copper now costs 28.25¢ per lb. This is off ¼¢ from last week's price. The initial move was made early this week by one of the big custom smelters. The others followed.

Although the drop puts custom smelter copper a full cent under producers' prices, the trade was much more eager to compare the new custom smelter price with aluminum. The difference between aluminum ingot and custom smelter copper ingot is now less than 1.25¢. And if aluminum producers raise their price 1¢ as is expected after the new wage settlement the difference will be less than ¼¢.

Many consider it possible that custom smelter copper will drop below aluminum ingot. In that case, they say, copper might recover some of the markets, particularly electrical applications, which it lost to aluminum.

The Defense Council of the Ingot Brass and Bronze industry notes a slight upturn in brass and bronze ingot shipments in June, compared to last year. The 18,888 tons shipped in June brings the half-year total to 132,830 tons. This is still well below the 149,082 tons shipped last year.

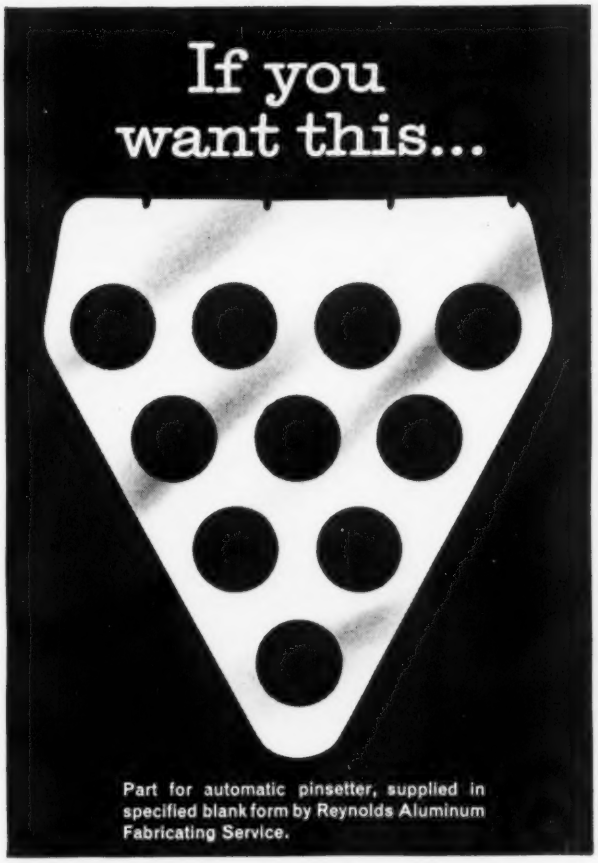
Tin prices for the week: July 17—96.25; July 18—96.50; July 19—96.125; July 22—96.00; July 23—95.75.*

* Estimate

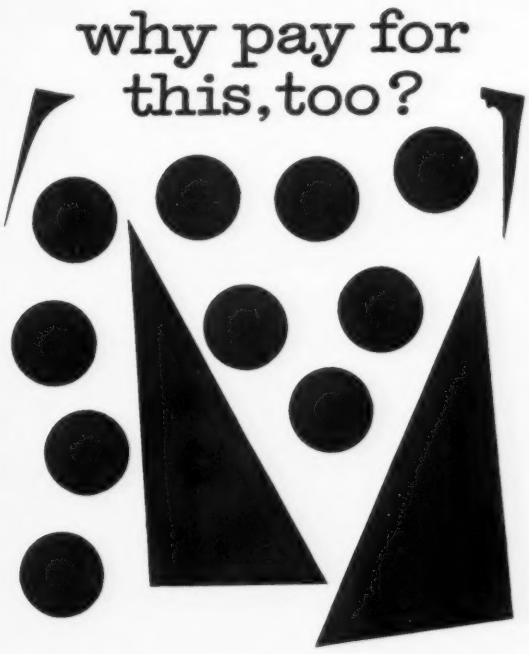
Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum ingot	27.10	25.90	8/10/56
Aluminum pig	25.00	24.00	8/10/56
Copper (E)	29.25	32.00	6/19/57
Copper (CS)	28.25	28.50	7/22/57
Copper (L)	29.25	32.00	6/19/57
Lead, St. L.	13.80	14.80	6/11/57
Lead, N. Y.	14.00	15.50	6/11/57
Magnesium ingot	36.00	34.09	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	200-250	250-275	6/6/57
Zinc, E. St. L.	10.00	10.50	7/1/57
Zinc, N. Y.	10.50	11.00	7/1/57

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see above; other primary prices, pg. 156.



Part for automatic pinsetter, supplied in specified blank form by Reynolds Aluminum Fabricating Service.



Aluminum punched out of blank, remelted by Reynolds Fabricating Service to eliminate scrap loss for customers.

Use Reynolds Aluminum Blanks

When you're buying metal for a part like that shown above it's a case of "who pays for the hole in the donut?" There's almost as much scrap metal as part metal.

You can solve this wasteful problem—when the part is aluminum—with Reynolds blanks. The shearing, cutting, piercing and punching is done before the metal is shipped to you. You have no scrap loss; you save scrap, shipping, handling and storing costs; you save production time and problems . . . you buy only the metal you use.

Reynolds Aluminum Fabricating Service can provide aluminum blanks to your specifications to help you save in purchasing, production and handling. Next time you have to produce or work an aluminum part, get a quote from Reynolds on aluminum blanks. It may help you save.

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See "Circus Boy", Reynolds exciting dramatic series, Sundays, NBC-TV

NONFERROUS PRICES *(Effective July 23, 1957)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3
1100, 1100, 3003	44.8	42.1	40.9	40.2
6061	51.8	46.8	45.1	42.9
6061-O	48.9	44.6	42.8	42.6

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8	42.7-44.4	57.6-61.1
10-14	43.4-44.8	58.4-62.7
24-36	46.4-46.9	68.7-78.1
36-38	54.8-55.4	91.5-94.9

Screw Machine Stock—2011-T-3

Size*	¾	⅞-⅞	¾-1	1¼-1½
Price	59.7	58.8	57.4	55.2

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.010 gage	$1.352	$1.803	$2.254	$2.704
.024 gage	1.686	2.252	2.815	3.378

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250-3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	108.1
AZ31B Spec	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	51.38	.....	48.61	51.57
Brass, 70/30	44.69	45.23	46.63	47.60
Brass, Low	47.40	47.94	47.34	50.21
Brass, R L	48.36	48.90	48.30	51.17
Brass, Naval	48.85	.....	43.16	52.26
Munts Metal	46.94	.....	42.75	.....
Comm. Bz.	49.86	50.40	49.80	52.42
Mang. Bz.	52.29	.....	46.69	.....
Phos. Bz. 5%	70.47	.....	70.97	.....

Free Cutting Brass Rod 32.87

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $9.50-$10.60; alloy, $14.75; Plate, HR, commercially pure, $8.00-$8.75; alloy, $10.75. Wire, rolled and/or drawn, commercially pure, $7.50-$8.00; alloy, $10.00; Bar, HR or forged, commercially pure, $6.15-$6.40; alloy, $6.15-$6.35; billets, HR, commercially pure, $6.00-$6.25; alloy, $6.00-$6.20.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex... 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be..... $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading..... $71.50
Bismuth, ton lots..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9%, small lots..... $ 4.55
Chromium, 99.8% metallic basis.... $ 1.31
Cobalt, 97-99% (per lb).... $2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined 39.50-53.50
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz... $ 2.25
Iridium, dollars per troy oz.... $90 to $100
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York..... $255 to $257
Nickel oxide sinter at Copper Cliff, Ont., contained nickel..... 71.25
Palladium, dollars per troy oz... $23 to $24
Platinum, dollars per troy oz.... $92 to $95
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.)..... 90.250
Thorium, per kg..... $43.00
Uranium, normal per kg..... $40.00
Vanadium ..... $ 3.45
Zirconium sponge $10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 29.50
- No. 120 ..... 28.50
- No. 123 ..... 27.00

80-10-10 ingot
- No. 305 ..... 33.50
- No. 315 ..... 31.50

88-10-2 ingot
- No. 210 ..... 41.25
- No. 215 ..... 37.50
- No. 245 ..... 33.50

Yellow ingot
- No. 405 ..... 24.00

Manganese bronze
- No. 421 ..... 27.00

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.75-26.50
- 0.60 copper max. 25.50-26.25

Piston alloys (No. 122 type)... 24.25-25.00
No. 12 alum. (No. 2 grade)... 21.50-23.00
108 alloy 22.75-23.50
195 alloy 25.25-26.00
13 alloy (0.60 copper max.) ... 24.50-25.50
AXS-679 ..... 22.75-23.50

Steel deoxidizing aluminum, notch bar granulated or shot

- Grade 1—95-97½% 23.50-24.25
- Grade 2—92-95% 22.25-23.00
- Grade 3—90-92% 21.25-22.00
- Grade 4—85-90% 20.25-20.75

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	25¼	24½
Yellow brass	19⅞	17⅞
Red brass	22¼	21½
Comm. bronze	23⅛	22⅝
Mang. bronze	17⅞	16⅞
Yellow brass rod ends	18⅞	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 24⅛
- No. 2 copper wire 22⅝
- Light copper 20⅜
- *Refinery brass 19¾
- Copper bearing material 21¼

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 24⅛
- No. 2 copper wire 22⅝
- Light copper 20⅜
- No. 1 composition 22½
- No. 1 comp. turnings 22¼
- Hvy. yellow brass solids 16½
- Brass pipe 18½
- Radiators 17½

Aluminum

- Mixed old cast. ..... 14 —14½
- Mixed new clips ..... 15½—16½
- Mixed turnings, dry ..... 14½—15½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 21 —21½
- No. 2 copper wire ..... 19½—20
- Light copper ..... 17¾—18¼
- Auto radiators (unsweated).. 13½—14
- No. 1 composition ..... 18½—19
- No. 1 composition turnings... 18 —18½
- Cocks and faucets ..... 14½—15
- Clean heavy yellow brass .... 12½—13
- Brass pipe ..... 15½—16
- New soft brass clippings .... 17 —17½
- No. 1 brass rod turnings .... 14¼—14¾

Aluminum

- Alum. pistons and struts .... 5½— 6
- Aluminum crankcases ..... 10½—11
- 1100 (2S) aluminum clippings 13½—14
- Old sheet and utensils ..... 10½—11
- Borings and turnings ..... 6½— 7
- Industrial castings ..... 10½—11
- 2024 (24S) Clippings ..... 12 —12½

Zinc

- New zinc clippings ..... 4 — 4½
- Old zinc ..... 3 — 3¼
- Zinc routings ..... 1¾— 2
- Old die cast scrap ..... 1½— 1¾

Nickel and Monel

- Pure nickel clippings 85-90
- Clean nickel turnings 70-75
- Nickel anodes 85-90
- Nickel rod ends 85-90
- New Monel clippings 45-48
- Clean Monel turnings 35-40
- Old sheet Monel 44-45
- Nickel silver clippings, mixed. 21
- Nickel silver turnings, mixed. 18

Lead

- Soft scrap lead ..... 9½—10
- Battery plates (dry) ..... 4¼— 4½
- Batteries, acid free ..... 2¾— 3

Miscellaneous

- Block tin ..... 75 —76
- No. 1 pewter ..... 59 —60
- Auto babbitt ..... 39 —40
- Mixed common babbitt ..... 11 —11½
- Solder joints ..... 15½—16
- Siphon tops 42
- Small foundry type ..... 13 —13¼
- Monotype ..... 13 —13¼
- Lino. and stereotype ..... 12 —12¼
- Electrotype ..... 11 —11¼
- Hand picked type shells ..... 8 — 8½
- Lino. and stereo. dross ..... 3¾— 4
- Electro. dross ..... 3 — 3¼

STEEL PRICES

(Effective July 23, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$114.00 *B3*		5.325 *B3*	7.80 *B3*	5.325 *B3*						
	Buffalo, N. Y.	$77.50 *R3, B3*	$96.00 *R3, B3*	$114.00 *R3, B3*	6.225 *B3*	5.325 *B3*	7.80 *B3*	5.325 *B3*	4.925 *R3, B3*	7.15 *R7*	7.325 *B3*			
	Phila., Pa.									7.70 *P15*				
	Harrison, N. J.													14.85 *C11*
	Conshohocken, Pa.		$101.00 *A2*	$121.00 *A2*					4.975 *A2*	7.20 *A2*	7.325 *A2*			
	New Bedford, Mass.									7.60 *R6*				
	Johnstown, Pa.	$77.50 *B3*	$96.00 *B3*	$114.00 *B3*		5.325 *B3*	7.80 *B3*							
	Boston, Mass.									7.70 *T8*				15.40 *T8*
	New Haven, Conn.									7.60 *R6*				
	Baltimore, Md.									7.15 *T8*				15.05 *T8*
	Phoenixville, Pa.					5.50 *P2*		5.50 *P2*						
	Sparrows Pt., Md.								4.925 *B3*		7.325 *B3*			
	Bridgeport, Wallingford, Conn.	$82.50 *N8*	$101.00 *N8*	$114.00 *N8*						7.60 *W1* 7.25 *N8*				
	Pawtucket, R. I. Worcester, Mass.									7.70 *A5* 7.90 *N7*				15.20 *T8* 15.40 *N7*
MIDDLE WEST	Alton, Ill.								5.125 *L1*					
	Ashland, Ky.								4.925 *A7*					
	Canton-Massillon, Dover Ohio		$96.00 *R3*	$114.00 *R3, T5*						7.15 *G4*		10.40 *G4*		14.85 *C11*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$77.50 *U1, R3*	$96.00 *U1, R3,W8*	$114.00 *U1, R3,W8*	6.225 *U1*	5.275 *U1, W8,P13*	7.75 *U1, Y1* 6.525 *W8*	5.275 *U1*	4.925 *W8, N4,A1*	7.25 *A1,T8, M8*			8.10 *W8, S9,I3*	14.85 *A1 S9,* 15.05 *G4*
	Cleveland, Ohio									7.15 *A5,J3*			8.10 *J3*	
	Detroit, Mich.			$114.00 *R5*					5.025 *G3, M2*	7.25 *M2D1D2 G3,P2,P11*	7.425 *G3*	10.60 *G3, D2*	8.10 *G3*	
	Anderson, Ind.									7.15 *G4*		10.40 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$77.50 *U1*	$96.00 *U1*	$114.00 *U1, Y1*	6 [illegible]	5.275 *U1*	7.75 *U1, I3*	5.25 *I3*	4.925 *U1, I3,Y1*	7.15 *Y1*	7.325 *U1, I3,Y1*	10.50 *Y1*	8.10 *U1, Y1*	
	Sterling, Ill.	$77.50 *N4*				5.275 *N4*			5.025 *N4*					
	Indianapolis, Ind.									7.30 *C5*				
	Newport, Ky.												8.10 *A9*	
	Middletown, Ohio									7.15 *A7*				
	Niles, Warren, Ohio Sharon, Pa.		$96.00 *S1, C10*	$114.00 *C10,S1*					4.925 *R3, S1*	7.15 *R3,T4 S1*	7.325 *R3, S1*	10.30 *S1, R3*	8.10 *S1*	15.05 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$77.50 *U1, P6*	$96.00 *U1, C11,P6*	$114.00 *U1, C11*	6.225 *U1*	5.275 *U1, J3*	7.75 *U1, J3*	5.275 *U1*	4.925 *P6*	7.15 *J3,B4, S7*			8.10 *S9*	15.05 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.275 *W3*			4.925 *W3*	7.15 *W3,F3*	7.325 *W3*	10.45 *W3*		
	Youngstown, Ohio	$77.50 *R3*	$96.00 *Y1, C10*	$114.00 *Y1*		5.425 *Y1*	7.75 *Y1*			7.15 *R3,Y1, C5*	7.325 *U1, Y1*	10.50 *Y1*	8.10 *U1, Y1*	
WEST	Fontana, Cal.	$88.00 *K1*	$105.50 *K1*	$135.00 *K1*		6.025 *K1*	8.50 *K1*	6.225 *K1*	5.775 *K1*	9.00 *K1*				
	Geneva, Utah		$96.00 *C7*			5.275 *C7*	7.75 *C7*		5.175 *S2*		7.575 *S2*			
	Kansas City, Mo.					5.375 *S2*	7.85 *S2*						8.35 *S2*	
	Los Angeles, Torrance, Cal.		$105.50 *B2*	$134.00 *B2*		5.975 *C7, B2*	8.45 *B2*		5.675 *C7, B2*				9.30 *B2*	
	Minnequa, Colo.					5.575 *C6*			6.025 *C6*	9.10 *K1*				
	Portland, Ore.					6.025 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$105.50 *B2*			5.925 *B2*	8.40 *B2*		5.675 *C7, B2*					
	Seattle, Wash.		$109.50 *B2*			6.025 *B2*	8.50 *B2*		5.925 *B2*					
SOUTH	Atlanta, Ga.					5.475 *A8*			5.125 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$77.50 *T2*	$96.00 *T2*			5.275 *T2, R3,C16*	7.75 *T2*		4.925 *T2, R3,C16* 5.225 *C10*		7.325 *T2*			
	Houston, Lone Star, Texas		$101.00 *S2*	$119.00 *S2*		5.375 *S2*	7.85 *S2*		5.175 *S2*		7.575 *S2*		8.35 *S2*	

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(Effective July 23, 1957)

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		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25 lb. base box	Electro* 0.25 lb. base box	Holloware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.925 *B3*	6.05 *B3*				7.275 *B3*	8.975 *B3*			6.15 *W6*	† Special coated mfg. terne deduct 50c from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25c. ELECTRO: 0.50-lb. add 25c; 0.75-lb. add 65c; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65c.		
	Claymont, Del.													
	Conshohocken, Pa.	4.975 *A2*	6.10 *A2*				7.325 *A2*							
	Coatesville, Pa.													
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										6.15 *B3*			
	Fairless, Pa.	4.975 *U1*	6.10 *U1*				7.325 *U1*	9.025 *U1*				$10.15 *U1*	$8.85 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.925 *B3*	6.05 *B3*	6.60 *B3*			7.275 *B3*	8.975 *B3*	9.725 *B3*		6.25 *B3*	$10.15 *B3*	$5.85 *B3*	
	Worcester, Mass.										6.45 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.35 *L1*			
	Ashland, Ky.	4.925 *A7*		6.60 *A7*	6.625 *A7*									
	Canton-Massillon, Dover, Ohio			6.60 *R3, R1*										
	Chicago, Joliet, Ill.	4.925 *W8, A1*					7.275 *U1*				6.15 *A5, R3, W8, N4, K2*			
	Sterling, Ill.										6.25 *N4, K2*			
	Cleveland, Ohio	4.925 *R3, J3*	6.05 *R3, J3*		6.625 *R3*		7.275 *R3 J3*	8.975 *R3, J3*			6.15 *A5*			
	Detroit, Mich.	5.025 *G3, M2*	6.15 *G3* 6.05 *M2*				7.375 *G2*	9.075 *G3*						
	Newport, Ky.	4.925 *A1*	6.05 *A1*											
	Gary, Ind. Harbor, Indiana	4.925 *U1, I3, Y1*	6.05 *U1, I3, Y1*	6.60 *U1, I3*	6.625 *U1, I3, Y1*	7.00 *U1*	7.275 *U1, Y1, I3*	8.975 *U1, Y1*			6.15 *Y1*	$10.05 *U1, Y1*	$8.75 *I3, U1, Y1*	7.50 *U1, Y1*
	Granite City, Ill.	5.125 *G2*	6.25 *G2*	6.80 *G2*	6.825 *G2*								$8.85 *G2*	7.60 *G2*
	Kokomo, Ind.			6.70 *C9*							6.25 *C9*			
	Mansfield, Ohio		6.05 *E2*			7.00 *E2*								
	Middletown, Ohio	4.925 *A7*	6.05 *A7*	6.60 *A7*	6.625 *A7*	7.00 *A7*	7.275 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	4.925 *R3, N3, S1*	6.05 *R3*	6.60 *R3*	6.625 *N3, S1*	7.00 *N3, S1*	7.275 *R3*	8.975 *S1, R3*					$8.75 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Donora, Pa.	4.925 *U1, J3, P6*	6.05 *U1, J3, P6*	6.60 *U1, J3*	6.625 *U1*		7.275 *U1, R3, J3*	8.975 *U1, J3*	9.725 *U1*		6.15 *A5, J3, P6*	$10.05 *U1, J3*	$8.75 *U1, J3*	7.50 *U1, J3*
	Portsmouth, Ohio	4.925 *P7*	6.05 *P7*								6.15 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.925 *W3, W5*	6.05 *W3, F3, W5*	6.60 *W3, W5*		7.00 *W3, W5*	7.275 *W3*	8.975 *W3*				$10.05 *W5, W3*	$8.75 *W5, W3*	7.50 *W5*
	Youngstown, Ohio	4.925 *U1, Y1*	6.05 *Y1*		6.625 *Y1*		7.275 *Y1*	8.975 *Y1*			6.15 *Y1*			
WEST	Fontana, Cal.	5.775 *K1*	7.30 *K1*									$10.80 *K1*	$9.50 *K1*	
	Geneva, Utah	5.025 *C7*												
	Kansas City, Mo.										6.40 *S2*			
	Los Angeles, Torrance, Cal.										6.95 *B2*			
	Minnequa, Colo.										6.40 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.625 *C7*	7.00 *C7*	7.35 *C7*							6.95 *C7*	$10.80 *C7*	$9.50 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.925 *T2, R3*	6.05 *T2*	6.60 *T2, R3*							6.15 *T2, R3*	$10.15 *T2*	$8.85 *T2*	
	Houston, Tex.										6.40 *S2*			

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		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.475 *B3*	8.775 *B3*	7.925 *B3*					
	Buffalo, N. Y.	5.425 *R3,B3*	5.425 *R3,B3*	7.30 *R3*,7.35 *B5*	6.475 *B3,R3*	8.775 *B3,B5*	7.925 *B3*	5.10 *B3*		7.20 *B2*	7.625 *B2*	7.65 *W6*
	Claymont, Del.							5.70 *P2*		7.20 *C4*	7.625 *C4*	
	Coatesville, Pa.							5.50 *L4*		7.20 *L4*	7.55 *L4*	
	Conshohocken, Pa.							5.20 *A2*	6.175 *A2*	7.20 *A2*	7.625 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *P2*			
	Milton, Pa.	5.575 *M7*	5.575 *M7*									
	Hartford, Conn.			7.90 *R3*		9.075 *R3*	7.925 *B3*					
	Johnstown, Pa.	5.425 *B3*	5.425 *B3*		6.475 *B3*			5.10 *B3*		7.20 *B3*	7.625 *B3*	7.65 *B3*
	Fairless, Pa.	5.575 *U1*	5.575 *U1*		6.625 *U1*							
	Newark, N. J.			7.75 *W10*		8.95 *W10*						
	Camden, N. J.			7.75 *P10*		8.95 *P10*						
	Bridgeport, Conn. Putnam, Conn.	5.650 *N8*	5.650 *N8*	7.65 *N8* 7.85 *W10*	6.550 *N8*	8.925 *N8*	8.00 *N8*					
	Sparrows Pt., Md.		5.425 *B3*					5.10 *B3*		7.20 *B3*	7.625 *B3*	7.75 *B3*
	Palmer, Worcester, Readville, Mass.			7.85 *B5,C14*		9.075 *A5,B5*						7.95 *A5, W6*
	Spring City, Pa.			7.75 *K4*		8.950 *K4*						
MIDDLE WEST	Alton, Ill.	5.625 *L1*										7.85 *L1*
	Ashland, Newport, Ky.							5.10 *A7,A1*		7.20 *A1*		
	Canton, Massillon, Ohio			7.30 *R3,R2*	6.475 *R3,T5*	8.775 *R3,R2, T5*						
	Chicago, Joliet, Waukegan, Ill.	5.425 *U1,R3, W8,N4,P13*	5.425 *U1,R3, N4,P13*	7.30 *A5, W10,W8, B5,L2,N9*	6.475 *U1,R3, W8*	8.775 *A5, W10,W8 L2,N9,B5*	7.925 *U1* 6.675 *W8*	5.10 *U1,A1, W8,I3*	6.175 *U1*	7.20 *U1,W8*	7.625 *U1* 7.40 *W8*	7.65 *A5,R3, W8,N4, K2,W7*
	Cleveland, Ohio	5.425 *R3*	5.425 *R3*	7.30 *A5,C13*		8.775 *A5, C13*	7.925 *R3*	5.20 *R3,J3*	6.175 *J3*		7.625 *R3, J3*	7.65 *A5, C13*
	Detroit, Mich.	5.525 *G3*	5.775 *G3*	7.55 *P3* 7.50 *P8,B5*	6.475 *R5* 6.575 *G3*	8.775 *R5* 8.975 *B5,P3, P8*	8.025 *G3*	5.20 *G3*		7.35 *G3*		
	Duluth, Minn.											7.65 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.425 *U1,I3, Y1*	5.425 *U1,I3, Y1*	7.30 *R3,M5*	6.475 *U1,I3, Y1*	8.775 *R3,M4*	7.925 *U1,I3, Y1*	5.10 *U1,I3, Y1*	6.175 *J3,I3*	7.20 *U1,Y1*	7.625 *U1, Y1*	7.75 *M4*
	Granite City, Ill.							5.30 *C2*				
	Kokomo, Ind.											7.75 *C9*
	Sterling, Ill.	5.525 *N4*	5.525 *N4*					5.10 *N4*				7.75 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.30 *C10*	6.475 *C10,S1*	8.775 *C10*	7.925 *S1*	5.10 *R3,S1*		7.20 *S1*	7.625 *R3, S1*	
	Pittsburgh, Pa. Midland, Pa. Donora, Pa.	5.425 *U1,J3,*	5.425 *U1,J3*	7.30 *A5,B4, R3,J3,C11, W10,S9,C8*	6.475 *U1,J3, C11*	8.775 *A5, W10,R3,S9, C11,C8*	7.925 *U1,J3*	5.10 *U1,J3*	6.175 *U1*	7.20 *U1,J3*	7.625 *U1,J3*	7.65 *A5, J3,P6*
	Portsmouth, Ohio											7.65 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.10 *W5*				
	Youngstown, Ohio	5.425 *U1,R3, Y1*	5.425 *U1,R3, Y1*	7.30 *A5,Y1, F2*	6.475 *U1,Y1*	8.775 *Y1,F2*	7.925 *U1,Y1*	5.10 *U1,R3, Y1*		7.20 *Y1*	7.625 *U1, R3,Y1*	7.65 *Y1*
WEST	Emeryville, Cal.	6.175 *J5*	6.175 *J5*									
	Fontana, Cal.	6.125 *K1*	6.125 *K1*		7.525 *K1*		8.625 *K1*	5.85 *K1*		7.95 *K1*	8.375 *K1*	
	Geneva, Utah							5.10 *C7*			7.625 *C7*	
	Kansas City, Mo.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*					7.90 *S2*
	Los Angeles, Torrance, Cal.	6.125 *C7,B2*	6.125 *C7,B2*	8.75 *R3,P14*	7.525 *B2*	10.65 *P14*	8.625 *B2*					8.66 *B2*
	Minnequa, Colo.	5.875 *C6*	5.875 *C6*					5.95 *C6*				7.90 *C6*
	Portland, Ore.	6.175 *O2*	6.175 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.125 *C7* 6.175 *B2*	6.125 *C7* 6.175 *B2*				8.675 *B2*					8.60 *C7,C6*
	Seattle, Wash.	6.175 *B2,N6*	6.175 *B2*				9.675 *B2*	6.00 *B2*		8.10 *B2*	8.525 *B2*	
SOUTH	Atlanta, Ga.	5.625 *A8*	5.625 *A8*									7.85 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.425 *T2,R3 C16*	5.425 *T2,R3, C16*	7.90 *C16*		8.775 *R3*	7.925 *T2*	5.10 *T2,R3*			7.625 *T2*	7.65 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*	5.20 *S2* 5.45 *L3*		7.30 *S2*	7.725 *S2*	7.90 *S2*

† Merchant Quality—Special Quality .35¢ higher.

STEEL PRICES *(Effective July 23, 1957)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N.J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 J. & L. Steel Co., Stainless Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Youngstown *R3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fontana *K1*	+8.25	+23.5	+5.25	+19.5	+1.75	+15.60	0.75	+14.25	1.25	+13.25	1.75	+12.75	3.25	+13.00								
Pittsburgh *J3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Alton, Ill. *L1*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Sharon *M3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fairless *N2*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Pittsburgh *N1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Wheeling *W5*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Wheatland *W4*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Youngstown *Y1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Indiana Harbor *Y1*	4.25	+11.0	7.25	+7.0	10.75	+2.50	13.25	+1.75	13.25	+0.75	14.25	+0.25	15.75	+0.50								
Lorain *N2*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Youngstown *R3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Fairless *N2*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Fontana *K1*	+3.75		0.25		3.25		3.75		4.25		4.75		5.25									
Pittsburgh *J3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Alton, Ill. *L1*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Sharon *M3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Pittsburgh *N1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Wheeling *W5*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Wheatland *W4*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Youngstown *Y1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Indiana Harbor *Y1*	8.75	+5.0	12.75	+1.0	15.75	3.50	16.25	2.25	16.75	3.25	17.25	3.75	17.75	2.50								
Lorain *N2*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.75	+16.0	2.25	+13.50	7.25	+8.50

Threads only buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount

* Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 10¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	5	2.485	T-5
1.5	4	1.5	8	—	1.04	M-1
6	4	2	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium	.83	D-3, D-5
Oil hardened manganese	.45	O-2
Special carbon	.41	W-1
Extra carbon	.345	W-1
Regular carbon	.29	W-1

Warehouse prices on and east of Mississippi are 4c per lb higher. West of Mississippi, 6c higher.

CLAD STEEL

Base prices, cents per lb f.o.b

Stainless Type	Cladding	Plate (A3, J2, L4) 10 pct	15 pct	20 pct	Sheet (I2) 20 pct
	302				
	304	37.95	42.25	46.70	49.85
	316	44.40	49.50	54.50	54.50
	321	40.05	44.60	49.30	49.30
	347	42.40	47.55	52.80	52.80
	405	29.85	33.35	36.85	36.85
	410	29.55	33.10	36.70	36.70
	430	29.80	33.55	37.25	37.25

CR Strip (S9) Copper, 10 pct, 2 sides, 39.85; 1 side, 33.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field		9 625	
Armature	11.10	10 85	11.35
Elect.	11.80	11.55	12.05
Hermetic		12.10	
Motor	12.90	12.65	13.15
Dynamo	13.95	14.75	14.20
Trans. 72	15.00		15.25
Trans. 65	15.55		
		Grain Oriented	
Trans. 58	16.05	Trans. 80	19.20
Trans. 52	17.10	Trans. 73	19.70

Producing points: Beech Bottom (W5); Brackenridge (A3); Granite City (G2); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (N5); Niles, O. (N3); Vandergrift (U1); Warren, O. (R5); Zanesville, Butler (A7).

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City R3	173	187		212	193	8.65	9.20
Aliquippa J3***	173	190			190	8.65	9.325
Atlanta A8**	175			208	199	8.50	9.10
Bartonville K2**	175	192	178	214	198	8.75	9.425**
Buffalo W6							
Chicago N4***							
Cleveland A6							
Cleveland A5						8.65	
Crawf'dsv. M4**	175	192			198	8.75	9.425
Donora, Pa. A5	173	187		212	193	8.65	9.20
Duluth A5	173	187		212	193	8.65	9.20
Fairfield, Ala. T2	173	187		212	193	8.65	9.20
Galveston D4	8.95‡						
Houston S2	178	192		217	198	8.90	9.45
Johnstown B1***	173	190**	172		196**	8.65	9.325**
Joliet, Ill. A5	173	187		212	193	8.65	9.20
Kokomo C9*	175	189*		214	195*	8.75	9.30*
L. Angeles B2***						9.60	10.275
Kansas City S2*	178	192*		217	198*	8.90	9.45*
Minnequa C6†	178	192†	177	217	198†	8.90	9.45†
Monessen P6					193	8.65	9.20
Palmer, Mass. W6							
Pittsburg, Cal. C7	192	210			213	9.60	10.15
Rankin, Pa. A5	173	187			193	8.65	9.20
So. Chicago R3	173	187			193	8.65	9.20
S. San Fran. C6†				236		9.60	10.15†
Sparrows Pt. B3**	175			214	198	8.75	9.425
Struthers, O. Y1*						8.65	9.30
Worcester A5	179					8.95	9.50
Williamsport S5							

* Zinc less than .10¢.
** 11-12¢ zinc.
*** .10¢ zinc.
† Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. T8	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W12					
Boston T8	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. R7	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. S9	8.95	10.40	12.60	15.60	18.55
Cleveland A5					
Dearborn S1	9.05	10.50	12.70		
Detroit D1	9.05	10.50	12.70		
Detroit D2	9.05	10.50	12.70		
Dover, O. G4	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M8	9.05	10.40	12.60		
Franklin Park, Ill. T8	9.05	10.25	12.45	15.45	18.40
Harrison, N. J. C11					
Indianapolis C5					
Los Angeles	11.15	12.60	14.80	17.80	
New Castle, Pa. B4	8.95	10.40	12.60	15.60	
New Haven, Conn. D1	9.40	10.70	12.90	15.90	
Pawtucket, R. I. N7	9.50	10.70	12.90	15.90	18.85
Pittsburgh S7					
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. S1	8.95	10.40	12.60	15.60	18.55
Trenton R4					
Wallingford W1	9.40	10.70	12.90	15.90	18.75
Warren, Ohio T4					
Worcester, Mass. A5					
Youngstown C5					

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	C.D.	Elec. Weld H.R.	C.D.
Babcock & Wilcox	2	13	36.34	42.56	33.21	.....
	2½	12	48.94	57.31	44.73	.....
	3	12	56.51	66.18	51.66	.....
	3½	11	65.97	77.25	60.30	.....
	4	10	87.61	102.59	80.07	.....
National Tube	2	13	36.34	42.56	33.21	.....
	2½	12	48.94	57.31	44.73	.....
	3	12	56.51	66.18	51.66	.....
	3½	11	65.97	77.25	60.30	.....
	4	10	87.61	102.59	80.07	.....
Pittsburgh Steel	2	13	36.34	42.56	.....	.....
	2½	12	48.94	57.31	.....	.....
	3	12	56.51	66.18	.....	.....
	3½	11	65.97	77.25	.....	.....
	4	10	87.61	102.59	.....	.....

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Hot-Rolled (special quality)	Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.61	8.97	9.05	9.01		10.68				
Baltimore	$.10	7.88	8.98	9.75	8.36	8.26	8.75	8.53		9.13	14.99	14.44	18.39	18.09
Birmingham	.15	8.18	9.45	10.15	8.23	8.56	8.64	8.07	8.60	10.57				
Boston	.10	9.41	10.50	11.56	9.45	9.18	9.69	9.07	9.57		15.79	15 34	19.14	19.14
Buffalo	.15	8.40	9.60	11.25	8.65	9.05	8.65	8.40	8.95	8.85	15.65	14.65	19.01	18.25
Chicago	.15	8.35	9.60	10.15	8.38	8.71	8.79	8.07	8.75	8.95	15.30	14.80	18.65	18.60
Cincinnati	.15	8.49	9.65	10.20	8.69	9.08	8.89	8.53	9.07	9.46	15.61	14.61	18.96	18.21
Cleveland	.15	8.33	9.60	10.10	8.48	8.94	8.57	8.16	8.84	9.20	15.39	14.39	18.74	17.99
Denver		9.70	11.30	12.49	9.80	9.70	9.80	9.95		10.65				17.60
Detroit	.15	8.58	9.85	10.55	8.73	9.06	8.89	8.52	9.05	9.30	15.46	14.56	18.81	18.16
Houston		8.80	9.75		7.75	8.80	8.00	8.05		10.65	15.50		19.30	19.05
Kansas City	.20	8.52	9.72	10.07	8.60	8.83	8.87	8.73		9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	9.60	10.30		9.65	9.65	9.65	9.10	9.65	12.85	16.45	15.60	20.30	19.70
Memphis	.15	8.02	9.22		8.12	8.35	8.39	8.25		9.85				
Milwaukee	.15	8.48	9.73	10.28	8.51	8.84	9.00	8.88	8.71	9.18	15.43	14.93	18.78	18.73
New York	.10	8.97	10.23	10.66	9.41	9.53	9.01	9.67	9.48		15.02	14.69	18.42	18.29
Norfolk	.20	8.00			8.40	8.35	8.70	8.45		10.70				
Philadelphia	.10	8.25	9.17	10.34	8.92	8.78	8.80	8.81	9.18	9.41	15.61	15.11	18.96	18.91
Pittsburgh	.15	8.33	9.60	10.50	8.48	8.71	8.79	8.75	8.75	9.20	15.80	14.80	19.35	18.60
Portland		9.50	11.20	11.55	11.35	9.30	9.65	9.65		14.15	16.70	16.10	20.40	20.25
San Francisco	.10	9.45	10.85	10.65	9.55	9.70	9.60	9.80	9.90	13.10	16.45	15.60	20.30	19.70
Seattle		9.95	11.15	11.60	10.00	9.70	9.80	10.10	9.85	14.05	16.55	15.85	19.50	19.45
Spokane	.15	10.10	11.30	11.65	10.15	9.85	9.95	10.25	10.00	14.20		16.75		20.35
St. Louis	.15	8.69	9.94	10.51	8.74	9.08	9.25	8.43	9.12	9.56	15.66	15.16	19.01	18.96
St. Paul	.15	8.79	10.04	10.61	8.84	9.30	9.38	9.22		9.66		14.62		18.27

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each othe ror with galvanized sheets for quantity.
†16 gage. ††10¢ zinc. ‡Deduct for country delivery.

(Effective July 23, 1957)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	$5.525	6.50	6.975				
Cleveland *R3*							14.75
So. Chicago *R3*				9.75			
Ensley *T2*	$5.525	6.50					
Fairfield *T2*		6.50		9.75		6.60	
Gary *U1*	$5.525					6.60	
Huntington *C16*		6.50					
Ind. Harbor *I3*	$5.525		6.975	9.75		6.60	
Ind. Harbor *Y1*				9.75			
Johnstown *B3*		6.50					
Joliet *U1*			6.975				
Kansas City *S2*				9.75			14.75
Lackawanna *B3*	$5.525	6.50	6.975			6.60	
Lebanon *B3*			6.975		14.50		14.75
Minnequa *C6*	$5.525	7.00	6.975	9.75		6.60	14.75
Pittsburgh *P5*							14.75
Pittsburgh *J3*				9.75			15.25
Seattle *B2*				10.25		6.75	
Steelton *B3*	$5.525		6.975			6.60	
Struthers *Y1.2*				9.75			
Torrance *C7*						6.75	
Williamsport *S5*		6.50					
Youngstown *R3*				9.75			

COKE

Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$15.00 to $15.75
Foundry, beehive (f.o.b. oven)	$17.50 to $19.00
Foundry oven coke	
Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Is., Pa.	29.25

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unbored.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100,110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Cast elliptical, 18 in. or longer, 5000 lb lots	45.75
Electrodeposited	37.00
Brass, 80-20, ball anodes, 2000 lb or more	48.60
Zinc, ball anodes, 2000 lb lots	18.00
(for elliptical add 2¢ per lb)	
Nickel, 99 pct plus, rolled carbon, 5000 lb	102.25
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.70
Tin, ball anodes and elliptical $1.07 per in.	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	74.80
Copper sulphate, 100 lb bags, per cwt.	24.35
Nickel salts, single, 100 lb bags	40.50
Nickel chloride, freight allowed, 300 lb	45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.05
(Philadelphia price 23.30)	
Zinc cyanide, 100 lb	59.00
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 100,000 lb or more	31.00

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
	Pct Discounts			
½" and smaller x 6" and shorter	49	54	56	57
⅝" thru 1" x longer than 6"	35	40	43	45
Rolled thread carriage bolts ½" & smaller x 6" and shorter	49	54	56	57
Lag, all diam. x 6" & shorter	49	54	56	57
Lag, all diam. longer than 6 in.	39	44½	47	48½
Plow bolts, ½" and smaller x 6" and shorter	49	54	56	57

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	60½
⅞ in. to 1 in. inclusive	55½
1⅛ in. to 1½ in. inclusive	58½
1⅝ in. and larger	53½
C. P. Hex reg. & hvy.	
¾ in. and smaller	60½
⅞ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	46½
Semi-finished Hex Nuts	
⅝ in. or smaller	60½
¾ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½
(Add 25 pct for broken case or keg quantities)	
Finished	
⅞ in. and smaller	63

Rivets

	Base per 100 lb
½ in. and larger	$12.25
	Pct Off List
7/16 in. and smaller	19

Cap Screws

	Discount (Packages) Full Finished	H. C. Heat Treat
New std. hex head, packaged		
⅝" diam. and smaller x 6" and shorter	40	26
¾" ⅞" and 1" diam. x 6" and shorter	22	3
⅝" diam. and smaller x longer than 6"	8	+13
¾", ⅞", and 1" diam. x longer than 6"	+ 6	+32

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	58	49
¾" through 1" dia. x 6" and shorter	45	33

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish		Discount Mach. Screws	Stove Bolts
Cartons		19	32
Bulk	*Quantity*		
To ¼" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	15,000-100,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screws & Stove Bolt Nuts

		Discount Hex	Square
In cartons		16	19
	Quantity		
In Bulk ⅝" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.7
Chicago	134.1
San Francisco-L. A.	141.8

Dec. 1955 value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick

	Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$135.00
No. 1 Ohio	120.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$150.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	157.00-160.00
Silica cement, net ton, bulk, Latrobe	28.50
Silica cement, net ton, bulk, Chicago	25.50
Silica cement, net ton, bulk, Ensley, Ala.	26.50
Silica cement, net ton, bulk, Mt. Union	24.50
Silica cement, net ton, bulk, Utah and Calif.	37.00

Chrome Brick *Per net ton*

Standard chemically bonded, Balt.	$105.00
Standards chemically bonded, Curtiner, Calif.	115.00
Burned, Balt.	99.00

Magnesite Brick

Standard, Baltimore	$131.00
Chemically bonded, Baltimore	116.00

Grain Magnesite St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite *Per net ton*

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.00
Midwest	16.35
Missouri Valley	15.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over	10.5¢
F.O.B. Riverton or Camden, New Jersey, West of Miss. River	9.5¢
Domestic sponge iron, 98+% Fe, 23,000 lb. and over del'd East of Miss. River	10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River	9.5¢
Canadian sponge iron, del'd in East, carloads	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 3 to 20 micron, 98%, 99.8+% Fe.	88.0¢ to $2.90
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	37.4¢ to 41.5¢
Copper electrolytic	45.75¢
Copper, reduced	49.75¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe .03 max. Del'd	$5.00
Lead	8.90¢ plus metal value
Manganese f.o.b. Extron, Pa.	46.0¢
Molybdenum, 99%	$3.60 to $3.95
Nickel, chemically precipitated	$1.05
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed #80	$1.13
Silicon	43.50¢
Solder powder. 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	$1.02
Stainless steel, 316	$1.20
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh) $3.75 (nominal)	
Zinc, 10 ton lots	18.5¢ to 31.7¢

FERROALLOY PRICES

(Effective July 23, 1957)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.50	0.20% C....	38.50
0.03% C....	41.00	0.50% C....	38.25
0.06% C....	39.50	1.00% C....	37.50
0.10% C....	39.00	1.50% C....	37.35
0.15% C....	38.75	2.00% C....	37.25

4.00-4.50% C, 67.70% Cr, 1-2% Si.. 27.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 26.50
0.025% C (Simplex)..... 34.75
0.10% C, 50-52% Cr, 2% max Si.... 35.50
8.50% max. C, 50-55% Cr, 3-6% Si.. 24.00
8.50% C, 50-55% Cr, 3% max. Si... 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C.....	$1.31
0.50% max. C.....	1.31
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed.....	19.65
Less ton lots.....	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.75
Johnstown, Pa.	12.75
Sheridan, Pa.	12.75
Philo, Ohio	12.75
S. Duquesne	12.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed	17.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb.....	38.00
Premium for Hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 25.50

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn.....	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet.....	15.10
Ton lots, packed, pallets.....	16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe..	22.20	20.90
98% Si, 0.75% Fe	22.95	21.65

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	7.70
Ton lots, packed	10.50

Electric Ferrosilicon

Contract prices, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	13.00	75% Si....	16.40
65% Si....	15.25	85% Si....	18.10
	90% Si....	19.50	

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.20
Crucible	3.30
High speed steel (Primos).....	3.40

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

Alsifer, 20% Al, 40% Si, 40% Fe. Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo $1.28

Ferrocolumbium, 50-50%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$4.90
Less ton lots	4.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd ton lots, 2-in. x D per lb con't Sb plus Ta $4.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth Pa., per pound contained Mo $1.68

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload.. ....$110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.60 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.41
bags, f.o.b. Washington, Pa. Langeloth, Pa. $1.33

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 contract, basis, per pound contained V_2O_5 ..... $1.38

Zirconium contract basis per lb of alloy
35-40% f.o.b. freight allowed, carloads, packed ..... 27.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Bortam, f.o.b. Niagara Falls,

Ton lots per pound	45¢
Less ton lots, per pound ..	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots $2.15

RAILWAY EQUIPMENT
FOR SALE
Used - As Is - Reconditioned

RAILWAY CARS
All Types

SERVICE-TESTED
FREIGHT CAR REPAIR PARTS
For All Types of Cars

LOCOMOTIVES
Diesel, Steam, Gasoline
Diesel-Electric

SPECIAL
STANDARD GAUGE CARS
10—Air-Operated, 30-Cubic Yard, Drop Door
SIDE DUMP CARS
ORE HOPPER CARS
20—40-Ton Capacity
4—50-Ton Capacity
COVERED HOPPER CARS
15—70-Ton Capacity

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6,000- 8,000- and 10,000-Gallon
Cleaned and Tested

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Chicago 33, Illinois
Phone: Mitchell 6-1212
New York Office
50-B Church Street
New York 7, N. Y.
Phone: BEekman 3-8230
"ANYTHING containing IRON or STEEL"

New York Dealers Very Busy

Used equipment sellers kept active as earlier inquiries turn into sales.

Buyers are still shopping around carefully, but demand for late-model tools is good.

▪ "We've been swamped since the beginning of July. A great many earlier inquiries have suddenly turned into full-grown orders this month."

That's the way one prominent dealer sums up the used and rebuilt machinery business in the New York area for July. And other dealers bear him out. The picture is the same throughout the area; July has opened the floodgates on orders.

Best Sellers—One dealer reports strong demand for heavier tools, especially vertical and horizontal boring mills and heavy-duty lathes in large sizes. Another mentions good business in late-model welding machines. Rolls, heavy shears and press brakes are bringing high prices when dealers have them to sell, continuing to reflect the summer construction boom, despite the current rash of strikes in that industry.

Talk in the trade is that the Atomic Energy Commission has recently placed a large group of orders in this area for unspecified material. Concrete pipe makers are known to be buying briskly and in some hurry, presumably to fill AEC orders.

Shrewd Shoppers—Dealers agree that the current order rush shows the results of shopping around earlier this spring when the complaint was generally, "Lots of inquiries but little real business." The tight money situation undoubtedly has played a large role in the lag before final sales. Customers have been shopping to make sure they were geting the best buy, playing it safe before actually laying out expensive cash for new machinery.

Tight money or not, the demand for good, late-model used tools is still there. Some buyers are coming from as far away as the West Coast to get the tools they want.

Recent reports of the seeming certainty of higher prices for new machine tools in the near future are expected to prove an added prop to sales for the rest of the summer and into the fall. Only fear is that higher new tool prices may slow down replacement and cut the flow of good-quality tools in the used market.

"Production on this machine is down 49 pct. How come?"

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSOR
450 cu. ft. Ingersoll Rand XRE, 100# Pressure 100 H.P. Westinghouse Motor 440/3/60.

BENDER & STRAIGHTENER
Pels Type JH-26 Bends & Straightens Beams 15x5.84 x60 lb., Angles Equal 8x8x1/8", etc.

BENDING ROLLS
10' x 1/2" Kling Pyramid Type—LATE
16' x 5/8" Bansome, Pyramid Type
20' x 1" Hilles & Jones Pyramid Type

BRAKES—LEAF TYPE
8' x 3/16" Dreis & Krump
12' x 1/4" Dreis & Krump
12' x 1/2" Dreis & Krump No. 228

BRAKE—PRESS TYPE
14' x 1/4" Superior Hydraulic—NEW

BUILDINGS
70' x 760' x 39'
50' x 325' x 24'

BULLDOZERS
#7 Ajax, 22" Stroke, 12"x65" Face of Crosshead
#27 W&W 22" Stroke, 16x80" Face of Crosshead

CORRUGATING MACHINE
12' Stanco Corrugating Machine Rolls 24" Dia.

CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P&H	56' Span 220/3/60
5 ton Whiting	48' Span 230/3/60 A.C.
5 ton Case	59' Span 220/3/25
5 ton P&H	55' Span 220/3/60
10 ton Shepard Niles	38' Span 440/3/60
15 ton Shepard Niles	52' Span 230 Volt D.C.
15 ton Shepard Niles	37' Span 220/440 A.C.
15 ton Shepard Niles	55' Span 220/440 A.C.
15 ton Niles	75' Span 220/3/60
20 ton P&H	57' Span 220/440 A.C.

DRAW BENCH
10,000 Acme Standard Single Draw Tube Draw Bench 44 Ft. Max. Length of Draw

FORGING MACHINES
1" to 5" Acme, Ajax, National

HAMMERS—BROAD DROP—STEAM DROP—STEAM FORGING—800 lb. to 20,000 lb.

LEVELERS—ROLLER
37" Torrington, 19 Roll 1-31/32" Dia. Backed up
42" Bliss Capacity .125" LATE
54 McKay, 17 Rolls, 3⅜" Dia.

PLANER—PLATE EDGE
35' Southwark, 16 Pneu. Jacks, Capy. 1¼"

PRESSES—HYDRAULIC
2000 ton Bliss Hydro-Dynamic, 18" Stroke Bed Area 54" x 55"
4500 Baldwin-Lima-Hamilton Hydr. Forging Press

PRESSES—TOGGLE DRAWING
#3½ Bliss 125 ton, Bolster 19" x 26"
#1618 Bliss 1550", Die Space 60" x 72"

PUNCH & SHEAR COMBINATIONS
Cleveland Style G Single End, 60" Throat
Cleveland Style W, 60" Throat
No. 1½" Buffalo Universal Ironworker

ROLLING MILLS
6" x 5" Torrington Wire Flattening Mill Line
10" x 14" Single Stand Two High
10" x 16" Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 36" Farrel Two Stand Two High
26" x 72" Cold Rolling Mill

SHEAR—ALLIGATOR
No. 4 Mesta RH LK, Capacity 2" x 12"

SHEAR—BAR
48" Mesta Bar Shear, Capacity 4" x 35" Slabs Hot

SHEAR—GATE
12' x 5/8" Niagara Model 1212, NEW 1951

SHEAR LINES
36" Hilliden Shear Line
60" Shear Line, With Leveller & Tables
96" x 14 Ga. Cleveland, With Playoff, Leveller, Elect.

SHEARS—SQUARING
6' x 10 Ga. Niagara No. 672
8' x ¼" Niagara—NEW 1952
10' x ¼" Cincinnati #1810
10' x 5/16" Cincinnati #2510

ROLLS—PLATE STRAIGHTENING
72" Hilles & Jones 6 Rolls 11" Dia.
60" Niles Bement-P 7 Rolls 10¾", Dia.

SHEARS—ANGLE
6x6x⅝" Hilles & Jones
4½x4½" Long & Allstatter

SLITTERS
24" Yoder Slitting Line
36" Paxon Slitting Line

STRAIGHTENERS
No. 3 Medart 3 Roll, Capacity to 4½" Tubing
Kane & Roach Roll Straightener & Cut-off Capacities 7/16" to ⅞" Hex. Bars

SWAGING MACHINES
#4 Fenn, Capacity 2¼" Tubing, LATE
#6½A Fenn, Capacity 2¾" Tube 3¾" Solid 10" Die Length Hydraulic Feed, LATE

WELDERS—SEAM
200 KVA Progressive Universal 220 Volt
400 KVA Federal Circular 440 Volt
500 KVA Federal Longitudinal 440 Volt

WIRE MACHINERY
#2 Vaughn 12-Die Continuous Wire Drawing Machine, Capacity 14 to 27 B&S Ga.
4—Block Vaughn Wire Drawing Machine 22" Diameter Blocks

• Manufacturing

A. T. HENRY & COMPANY, INC.

50 CHURCH ST., NEW YORK CITY 8
Telephone COrtlandt 7-3437

Equipment •

Confidential Certified Appraisals
Liquidations — Bona Fide Auction Sales Arranged

Consulting Engineering Service
Surplus Mfg. Equipment Inventories Purchased

2000# Chambersburg Pneumatic Forging Hammer Late Type, Serial 20CH392L7.

4000 lb. Chambersburg Double Frame Steam Forg. Hammer

2500 lb. Erie Single Leg Steam Forg. Hammer

No. 7 Ajax Forging Press, 700-ton capacity

3—2-ton Denison Auto. Hopper Feed & Index Table Hydr. Multipress

25 Transformer and Generating Arc Welders

2500 lb. Model E Chambersburg Steam Drop Hammer, New 1944

6' x 10 ga. Cincinnati Squaring Shear

¼" x 8' Pexto Gate Shear; 20" throat

4" National High Duty Upsetting & Forging Machine, air clutch, also one with regular clutch, also 1", 2", 3" air clutch

Williams White Bulldozers from 5-ton to 300-ton

Landis Landmaco and other Landis Threading Machines

Single & Double End Punches

No. 3 Motch & Merryweather Saw, with Saw Grinder

Conomatic, 4 Spin. Cap. 1½" Rd.

BOLT, NUT AND RIVET MACHINERY, COLD HEADERS, THREAD ROLLERS, THREADING MACHINES, TAPPERS, COLD BOLT TRIMMERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES.

DONAHUE STEEL PRODUCTS CO.
1919 W. 74th Street, Chicago 36, Ill.

RE-NU-BILT
GUARANTEED
ELECTRIC POWER EQUIPMENT
DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	400/500
3	1375	G.E.	MCF	415	1200
1	1200	G.E.	MCF	600	450/600
1	940	Whse.	QM	250	110/170
1	800	Whse.		260	250/550
		With United Gear Set 7:1 Ratio			
3	450	Whse.		550	415
2	300	G.E.	MPC	230	400
1	250	G.E.	MPC	230	400/600
2	200	Whse.	CB-207-I	250	850/1200
1	150	G.E.	CD-B B.	600	250/700
1	150	Cr.Wh.	65-H	230	1150
1	125	Whse.	SK-185	230	350/1050
1	125	Whse.	SK-183	230	850
2	100	Whse.	SK-181	230	450/1000
1	60-100	G.E.	RF-17	230	450/900
2	75	Cr.Wh.	52 H TEFC	230	860
1	50	G.E.	MH-112-AE	230	550
6	40	Rel.	385F TEFC BB	230	500/1500
2	30-40	Whse.	SK-131.5-BB DP	230	500/1500
3	(unused)	30 G.E.	CDM-85 BB	230	2200

MG SETS — 3 Ph. 60 Cy.

Qu.	KW	Make	RPM	DC Volts	AC Volts
2	2000-2400	G.E.	450	250/300	2300/4600
1	2000	G.E.	500		
			25 cy.	660	11000
1	2000	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
3	1000	G.E.	720	600	6600/13200
2	1000	G.E.	514	600	6600/13200
1	750	G.E.	720	125/250	2300/4600
1	500	Whse.	900	125/250	440
2	300	G.E.	1200	250	2300
2	300	Whse.	1200	275	440/2300
1	200	Whse.	1200	550	2300
1	200	G.E.	1200	250	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	3000	A.C.	OISC	3	3300 x 2300
1	1500	G.E. auto.	HT	3	4000/4200/4400
3	1000	G.E.	HVDDJ	1	2400 x 480
3	1000	G.E.	OA/FA	1	13800 x 230/460
1	833	G.E.	H	1	13800 x 460
2	750	G.E.	Pyranol	1	4800 x 83.55
3	500	Kuhl.	OISC	1	13200 x 6600
1	500	G.E.	OISC	1	13200 x 2300
1	500	G.E.	HS	1	13800 x 600
1	500	G.E.	HT	3	4160 x 480/277
1	200	G.E.	AirCooled	3	432/480 x 120/208Y
3	150	G.E.	OISC	3	33000 x 2300/4600Y
1	50	G.E.	Askerel	3	13200 x 120/208Y
(unused)			Oiled		

BELYEA COMPANY, INC.
47 Howell Street, Jersey City 6, N. J.

REBUILT — GUARANTEED ELECTRICAL EQUIPMENT

MOTOR GENERATOR SETS

Qu.	KW	Make	RPM	D.C. Volts	A.C. Volts
5	1500	Al.Ch.	514	350/700	13800/6900/4160
1	1500	G.E.	514	250	2300/4000
1	1250	Whse.	900	600	2300/4000
2	1250	Al.Ch.	720	600	2300/4000
1	850	G.E.	720	240/350	2300
1	525	Whse.	900	600	2300/4000
1	500	Cr.Wh.	720	600	2300/440
1	500	G.E.	900	250	2300
4	500	Whse.	1200	125/250	2300
1	500	Al.Ch.	1200	250/300	2300
(2-unit)					
2	200	Whse.	1200	125/250	2300/440
2	150	Rel.	1200	125	2300/440
1	150	Whse.	1200	125/250	2300/440
1	150	G.E.	1200	250	4600/2300
1	100	Whse.	720	125/250	2300
1	75	Whse.	1200	125/250	2300

2—400 KW, G.E. sealed ignitron Mercury Arc Rectifiers complete with AC and DC switchgear and 475 KVA Pyranol Transf. 7400 V. 3 ph., 60 cycle.

DIRECT CURRENT MOTORS
230-Volt

Qu.	H.P.	Make	Type	R.P.M.
1**	1500	Whse.	Encl.	600
1**	700	Whse.	Encl.	143
1	700	Whse.	Encl.	300/700
2**	600	Whse.	MUI	300/1600
2	600	Whse.	QM	119/229
1	500	G.E.	MPC	450
1	500	Whse.	Mill	600/900
1	500	Whse.	Mill	500
1	275	Whse.	QM	425/850
1	200/250	El.Dy.	Ped. Brg.	400/1200
1	180	G.E.	MPC	400
1	175	G.E.	CD-175-A	850/1025
1	125	Whse.	SK-184	575/850
1	80	Rel.	651-T	575/1150
1	80	El.Dy.	25-S	525/1050
1	60-75	Whse.	SK-151	250/1000
1	50	Whse.	SK	500/1500
1	50	Whse.	SK-141	250/1000
2	30-40	Whse.	SK-143	500/1500
1	25	Whse.	SK	250/1000
1	22½	Whse.	SK-150	400/1200
1	25	Whse.	SK-121	200/1200
1	15	Whse.	SK-93	575/1725
2	5.7½	Rel.	T.E.F.C.	525/1350

** 600 volts.
All others—230 volts.

T. B. MAC CABE COMPANY
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Cable Address "Macsteel" Philadelphia, Pa.
Phone Davenport 4-8300

W & W No. 2 Hyd. Tube Bender.
Cinn. 6' x ¼" Brake, New.
Hartford 96" Circular Bases with index.
Cinn. 10' x ⅜" Shear, 1937.

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BENNETT MACHINERY CO.

800 TON NILES WHEEL PRESSES

(2) Late Type 800 ton Wheel Presses, 96" between bars; max. dist. ram and resistance head 9'3" wgt. each 65,000 lbs.
(1) 32" Ohio Dreadnaught Shaper, M. D.

375 Allwood Rd., Clifton, New Jersey
Phone: PRescott 9-8996 N. Y. Phone: LOngacre 3-1222

MG Set GE 250KW 250VDC 720RPM 375HP 220V Compressor 4000# Air 368 PD 150HP SYN MTR Motor 800 HP West CW 870RPM 2200V Controls Diesel Generator 60KW 250 VDC Cummins/GE Guillotine Bar Shear H&J #0 1½" Round Bar Tube Bender 1¼" W&W Universal Hyd. 15HP Reaction Gear 150HP Fawcus 11.7:1 H Dty

F. H. CRAWFORD & COMPANY, INC.
30 Church Street New York 7, N. Y.

1—34" REVERSING HOT STRIP MILL CONSISTING OF:

1—Slab re-heating furnace 44" wide x 93'4" long, 4 heating zones, oil and gas burners.

1—Mill drive motor, reversing, 2500 HP, 75 150 RPM, 600 volt D.C., with controls.

1—28" x 40" 2-high reversing mill having Morgoil bearings in roll stand, Timken bearings in pinion stand, universal spindles with carriers, 75 HP motor screw-down.

2—Re-heating coiling furnaces, each 50" wide, for gas or oil fuel, for coiling and uncoiling strip under tension while being rolled to thinner gauges.

1—Delivery table, 38" wide x 136'6" long, with anti-friction bearings. Speed 900 FPM.

1—Coiler 24" dia., driven by 100 HP, 485 1200 RPM motor. Timken bearings. Air push-off.

1—Coil discharge gravity conveyor 70'4" long.

1—Main motor-generator set for supplying reversing motor; also auxiliary generators.

All of the above equipment is in good operating condition, has been used very little. Further details will be furnished upon request.

FRANK B. FOSTER, INC.

2220 Oliver Building, Pittsburgh 22, Pa.
cable: "Foster, Pittsburgh" Telephone ATlantic 1-2780

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2-3 16" Model 2-K-4 Cleveland 4 spindle automatic, MD
2⅝" Conomatic 8 spindle
100 ton Model 25 Williams & White bulldozer
6" capacity Campbell Model 401 Cutamatic abrasive cut-off
Cleveland cradle type uncoilers
390 CFM 8" x 13" x 10" Ingersoll Rand Type XRE plate valve horizontal two stage 75 HP air compressor
2850 CFM Worthington electric air compressor with 650 HP synchronous motor
Model B2F1 Natco deep hole horizontal drill
No. 20 H. O. Baker Hydraulic feed drilling and boring machine
24" swing 3 spindle Allen No. 3 production high speed sensitive drill
8 spindle Model 8LV Davis and Thompson Rotomatic vertical drill, new 1947
Wicaco continuous oil groover, new in 1953, MD
No. 2 Cincinnati centerless grinder, Filmatic bearings
4" x 12" Model 8 Landis plain hydraulic cylindrical grinder
10" x 36" Landis type DC plain cylindrical grinder, hydraulic quick infeed
14" x 36" Landis type C plain cylindrical grinder
30" No. 208 Besley-Beloit motor on spindle double end disc grinder
53" No. 24A Gardner vertical spindle horizontal disc MD grinder
No. 72A3 Heald Gagematic internal grinder, MD
No. 72A3 Heald Sizematic swivel headstock internal grinder
20" No. 25A Heald hydraulic rotary surface grinder
6" x 72" Thompson round broach grinder, first class
No. 6-1 Nazel pneumatic die forging hammer
No. 2 Cincinnati centerless lapping machine, 1941, MD
Model 6DREL Potter & Johnston single spindle automatic mfg. lathe
20" x 90" centers LeBlond hardened ways production lathe
No. 3 Gisholt ram type universal turret lathe
No. 5 Gisholt universal ram type turret lathe, bar feed
Model 1H6 Libby saddle type turret lathe, bar feed, hardened ways
Model 2-H-8 Libby turret lathe
No. 4-36 Cincinnati hydromatic bed type production mill, 320 rpm.
No. 34-36 Cincinnati duplex hydromatic mill, rise and fall
52" Gisholt vertical boring and turning mill, PRT, MD
No. 2 Kearney & Trecker Milwaukee vertical mill, dial type
No. 2H Kearney & Trecker high speed dial type universal mill
30" x 30" x 8' Cincinnati "Hydro-Planer," double housing, MD

Write for latest stock list.

MILES MACHINERY CO.
PHONE SAGINAW PL 2-3105
2041 E. GENESEE AVE. SAGINAW, MICH.

RADIAL DRILLS

CARLTON MODEL 5A 10'-26". Power Head and Column Clamping, Power Head Traverse, Power Elevation. Motor on Arm. New 1942.

AMERICAN 7'-17" HOLE WIZARD. Power Clamping, Power Elevation, Power Head Traverse. Motor on Arm. New 1945.

Both machines in excellent condition

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eastern Rebuilt Machine Tools

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INTERNAL GRINDERS
No. 73 Heald Airplane, m. d., latest, new
No. 74 Heald, m. d.
No. 75A Heald, m. d., latest
No. 72 Heald, Plain Long Base, m. d., 1941
No. 78 Heald Centerless Cylinder, m. d.
No. 81 Heald Gagematic, Sizematic, m. d.
No. 81 Heald Plain & Sizematic, m. d.
No. 104 Rivett, m. d.
No. 172 Heald Plain Adjustable Gap Hydraulic m. d.

THREAD GRINDERS
No. 33 Excello Precision, m. d.

SNAG GRINDERS
Type No. 50—7½ H.P. Standard Elec. Tool Co. Double End, m. d.
25 H.P. U.S. Elec. Co., Heavy Duty Double End, m. d.

UNIVERSAL GRINDERS
10x24" Landis Type C, m. d.
12x48" Norton, m. d., latest
14"x48" Landis Universal
14x36" Norton, m.d.

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No. 3 Niles Cotter & Keyseat Milling Machine, m.d.
Morton, m.d., thru reversing gear box
No. 3 Mitts & Merrill, m.d.

TOOL & CUTTER GRINDERS
No. 1 Heald Tool Sharpener, m.d.
No. 2A Wm. Sellers Universal Tool Grinder, m.d.
No. 2B Sellers Wet Grinder, m.d.
No. 4T Sellers Tool, m.d., latest
No. 5T Sellers, m.d.
No. 13 Gleason Cutter Sharpener, m.d., late Ingersoll Face Mill Grinder
No. 13 Brown & Sharpe Universal Cutter Grinder, m.d.
12" Gleason Spiral Bevel Gear Cutter Sharpener, m.d.
No. 4-4 Barber-Colman Hob Sharpener
Sundstrand Tool Grinder, m.d.

HONE MACHINES
No. 3 Barnes Single Spindle Horizontal Internal Hone, new
No. 182 Barnesdrill, m.d.
No. 854 Micromatic Vertical Honing Machine, m.d.
H1 Micromatic Horizontal Hydrohoner, m.d.
H4 Micromatic Horizontal Hydrohoner, m.d.
No. 6 Barnes Twin Spindle
No. 306H Barnes Single Spindle
No. 224B Barnes Honing Machine, m.d.

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1500 pcs. BETH. SP-6A—35', 40', 60' & 65'
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288 pcs. BETH. ZP-32—48' & 62'
317 pcs. BETH. AP-3—20', 28' & 42'
400 pcs. BETH. BP-12—53 lb. 58' to 60'

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7-25, 44 & 65 TON GEN. ELECTRIC

4—1000 CFM AIR COMPRESSORS
4 1000 CFM INGER-RAND TWIN 90-90C TYPE 40 AIR COOLED NEW 1953 USED 6 MONTHS, EACH WITH 200 HP 3P 60C 440V DIRECT COUPLED MOTOR.

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Medart 6" Bar Turning Machine new 1948 used 2 months.

STROM MACHINERY CORP.
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3" x 3" x ⅜" Garlock Vertical Angle Bending Roll, M.D.

No. ½, No. 1½ Buffalo Forge Univ. Ironworkers, Coper, Notcher, M.D.

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FOR SALE OR RENT
1—1 yd. Northwest 41 Diesel Crane.
1—25 ton Bay City Truck Crane.
2—30 ton Gasoline and Diesel Locomotive Cranes.
1—44 ton G.E. Diesel Electric Locomotive.
1—100 ton G.E. Diesel Electric Locomotive.

B. M. WEISS COMPANY
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1—1000 HP, Combination Gear Reducer & Pinion Stand, Nash, ratio 7.07 to 1, input speed 175 RPM, max. input speed 400 RPM, 32" pinions, 2-high in pinion stand.

1—Lift Table, Farrel-Birmingham, for 20" x 60" mill, hydraulically operated.

1—Strip Uncoiling line, coil size 50" dia. x 56" wide, consisting of coil box, leveler, hump table, shear, gauge table, roller table.

1—Cupola, Morris, 90" I.D. x 40' high shell, including blowers, skip hoist, charging bucket, elec. hoist, mixing ladle.

1—15 ton O.E.T. Crane, Alliance, 230 volt DC, 59'6" span, cab operated, fishbelly girders.

1—Pinion Stand, 3-high, 18" pinions.

1—Pinion Stand, 30", 2-high, single helical cut teeth, steel plate fabricated case, force feed lubrication.

1—Pinion stand, 18", 2-high, modern design.

1—Mill Drive, 1750 HP, motor; 1750 HP, 2200 volt, 3/60/234 RPM & controls; Gear Reducer, Falk, S-15, ratio 8.15 to 1.

1—Mill Drive, 500 HP, Motor; G.E., 3/60/2200 volt, 354 RPM, & control; Gear Reducer, Fawcus, type HBV-1, ratio 10 to 1, with Francke couplings.

1—26" x 72" Cold Mill (skin pass), 2-high, with #12½ Falk speed reducer, conveyor table, 200 HP motor.

We fabricate Electric Melting Furnace Charging Buckets, for any size furnace.

Lou F. Kinderman

P. O. BOX 182 NILES, OHIO OLympic 2-9876

Press 250 ton Bliss #S1 S.S. 7½" stroke equipped with air clutch, air brakes, automatic Bliss roll feed, push-button controls.

This press like new, may be seen in operation.

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15-ton capacity, 48'0" span center to center of ground rails, 19'2" overhang each end, 86'4" bridge length, 72'0" full hook travel, 30' lift, wired for 220/440-V., 3 phase, 60 cycle, with G.E. motors and control, enclosed gears throughout. Hoist and bridge motors 50-HP each, trolley 7½-HP, Hoist 38 F.P.M., bridge 200 F.P.M., complete and in A-1 condition throughout. All conductor materials included. Still erected, available for immediate inspection. SAVE $35,000.00 over a NEW CRANE and get IMMEDIATE SHIPMENT.

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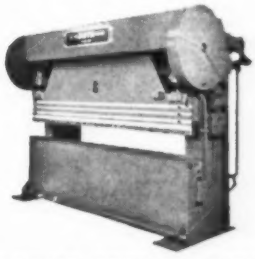
(STURDYBENDER)



POWER PRESS BRAKES

#100- 8	8' x 3/16"	10' Bed
#100-10	10' x 8 GA.	12' Bed
#120-10	10' x 3/16"	12' Bed
#150- 8	8' x 5/16"	10' Bed
#150-10	10' x 1/4"	12' Bed

Purchasers of Cyril Bath Brakes are entitled to services of a factory representative to assist and supervise installation, and instruct personnel in operation and maintenance. NO CHARGE FOR THIS SERVICE.

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COMPLETE BAR & ROD ROLLING MILL IMMEDIATELY AVAILABLE

Suitable for Rolling Steel or Copper billets down to bar or rod sizes, including hotbed, shears, and rod coiler.

STILL SET-UP, REASONABLY PRICED FOR IMMEDIATE SALE

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CAnal 6-2470

PUMPS

AT SACRIFICE PRICES!

1—INGERSOLL RAND CAMERON Pump & Motor, Size 4HMT-4, 100 HP G. E. Motor, 440 volts. Pump: 450 GPM, 539' Head. Hydro Test 1200, 1750 RPM. G. E. Automatic Compensator.

1—INGERSOLL RAND CAMERON Pump & Motor, Size 4RT-4, 200 HP, 3550 RPM, 440 volts. Pump: 450 GPM, 3560 RPM, 1100' Head. 1200 Hydro Test. Year Mfg. 1952. 200 HP Automatic Compensator.

1—WORTHINGTON Pump, Style 5KF365 DA7, Serial No. 1038687. Size 1½ x 4, 30 GPM 1200 lb. capacity, 25 HP G. E. Motor, 1760 RPM, TEPC 220 440, 260 RPM.

1—ALLIS CHALMERS Centrifugal Pump, 4 stage, 4" Inlet 3" outlet, 500 lb. pressure, 150 GPM, 75 Motor, HP Crocker Wheeler 3/60/220, 3600 RPM, 75 HP Cross-The-Line Starter.

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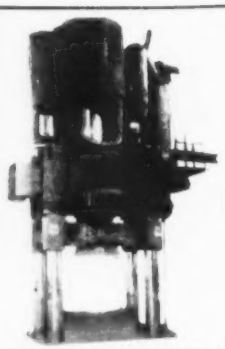

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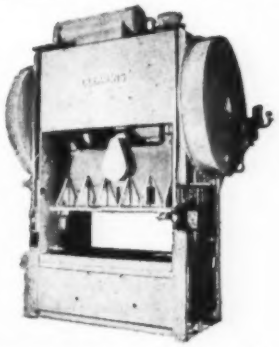

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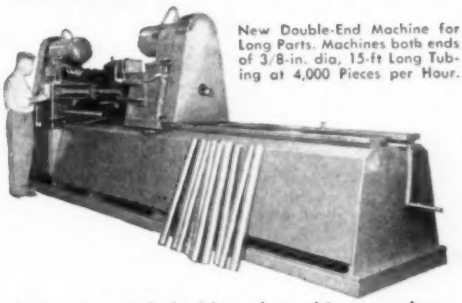

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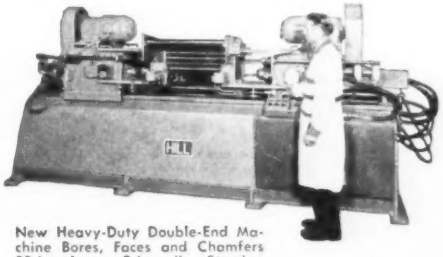

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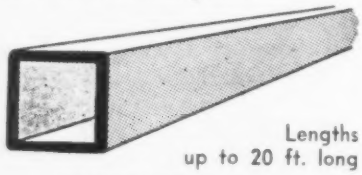
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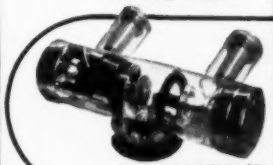
NICE BEARINGS
Help Advance X-RAY DESIGN

New demands for X-ray tube capacity have been answered by Machlett Laboratories, Inc., Springdale, Connecticut. The Machlett DYNAMAX design incorporates a rotating anode mounted on highly specialized ball bearings made by NICE BALL BEARING COMPANY.

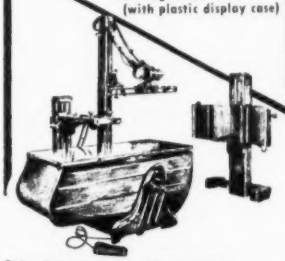
The success of the rotating anode principle is largely due to the development of suitable bearings. The NICE Bearings used by Machlett are made to exacting tolerances from special heat resisting steel and silver lubricated for use in high vacuum*. They have proven to be the complete answer to all requirement problems.

Now Available! New Catalog No. 190

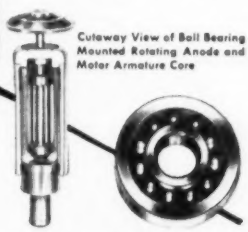
*Machlett U.S. Patent No. 2,315,280



Machlett DYNAMAX "25" Rotating Anode X-RAY Tube (with plastic display case)



Picker X-Ray Corporation Table and Tube-stand incorporating Machlett DYNAMAX



Cutaway View of Ball Bearing Mounted Rotating Anode and Motor Armature Core

Special NICE Bearing used at bottom of Rotor. A similar Special Bearing is mounted at top of Rotor.

NICE

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Bucket handles turnings —and other scrap, too!

Here is the husky Class K Hayward you see in so many mills and plants everywhere. You can't beat this powerful bucket for handling turnings, other scrap or almost anything else. Available also with special digging teeth for heavy rock work, cutting clay, handling rubbish. The Hayward Company, 50 Church St., New York 7, N. Y.

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B.F.Goodrich report:

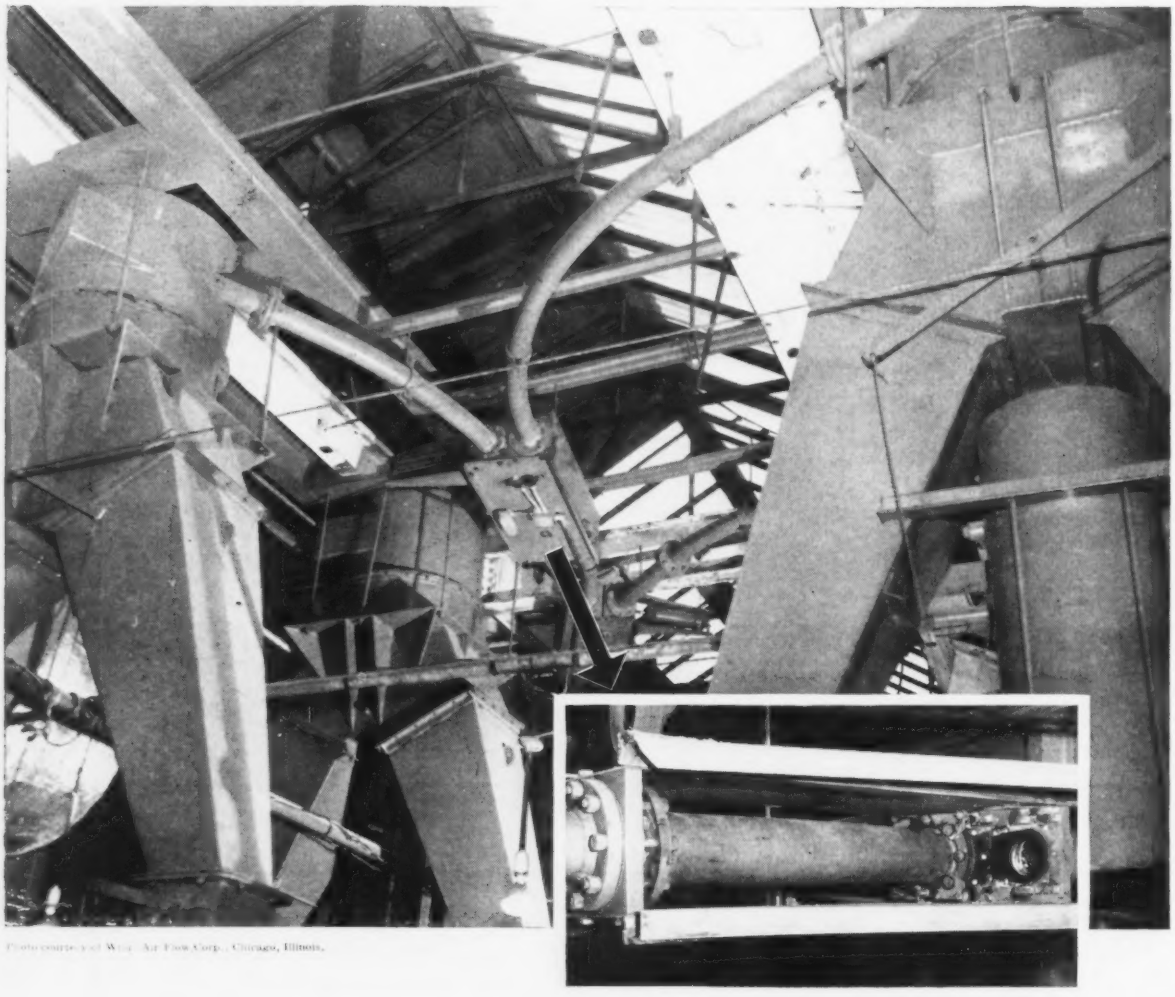

Photo courtesy of Wm. Ahlborn Corp., Chicago, Illinois.

Pipe carries sand the easy way

B. F. Goodrich improvements in rubber brought extra savings

Problem: In this foundry, workmen used to push wheelbarrows loaded with sand to the coremakers. Now the sand is simply blown through those overhead pipes to hoppers all over the building. Only one trouble.

A flexible hose was needed to switch the sand from one pipeline to another. (See inset.) Rubber hose was tried. The swirling sand quickly wore holes in it. Another kind stretched so much from the constant flexing that it jammed the switch.

What was done: When a B.F.Goodrich man heard of the problem he recommended a hose, specially developed by B.F.Goodrich to handle rough materials. It is made with a special wear-resisting rubber, so tough it outlasts hard steel 10 to 1 on many jobs. The hose has a specially treated fabric reinforcement that keeps it from stretching.

Savings: The B.F.Goodrich hose was tried. Instead of digging in and cutting, the sharp particles of sand simply bounce off the extra-soft rubber lining. It has now given 2 years of service and shows no signs of wear or stretch. In fact, the company making this equipment is now using only B.F.Goodrich hose.

For information: This hose is one of hundreds of kinds B.F.Goodrich makes for thousands of industrial uses. Your B.F.Goodrich distributor can recommend a hose exactly fitted to meet the special requirements of your work. And, as a factory-trained specialist, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-100, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

Here's annealing experience that dominates the industry

When it comes to single stack annealing furnace experience, there's really only one qualified engineering firm — that, the Lee Wilson Engineering Company, Inc., who have just received an order that will put them over the 500 furnace mark — more than 10 times the number of single stack furnaces built by the rest of the industry combined.

Lee Wilson first developed the single stack — high convection furnace some 10 years ago. Convinced that the Single Stack method was far superior to the multiple stack, Lee Wilson went to the design of single stacks exclusively in 1952, and is still the only exclusive builder of this type furnace.

TREND TO SINGLE STACK GROWS

In the past four years the industry has come to recognize the tremendous benefits of the single stack for volume annealing and, as a result, Lee Wilson has supplied furnaces to practically every major steel producer in the United States and abroad. A definite trend finds several of the large producers abandoning multiple stack annealing entirely.

Lee Wilson has designed and manufactured more than 10 TIMES AS MANY single stack furnaces and basket as the rest of the industry combined!

Get all the facts before you decide what kind of annealing system is best for your operation and we know you'll specify Single Stacks by Lee Wilson.

Lee Wilson* ENGINEERING COMPANY, INC.

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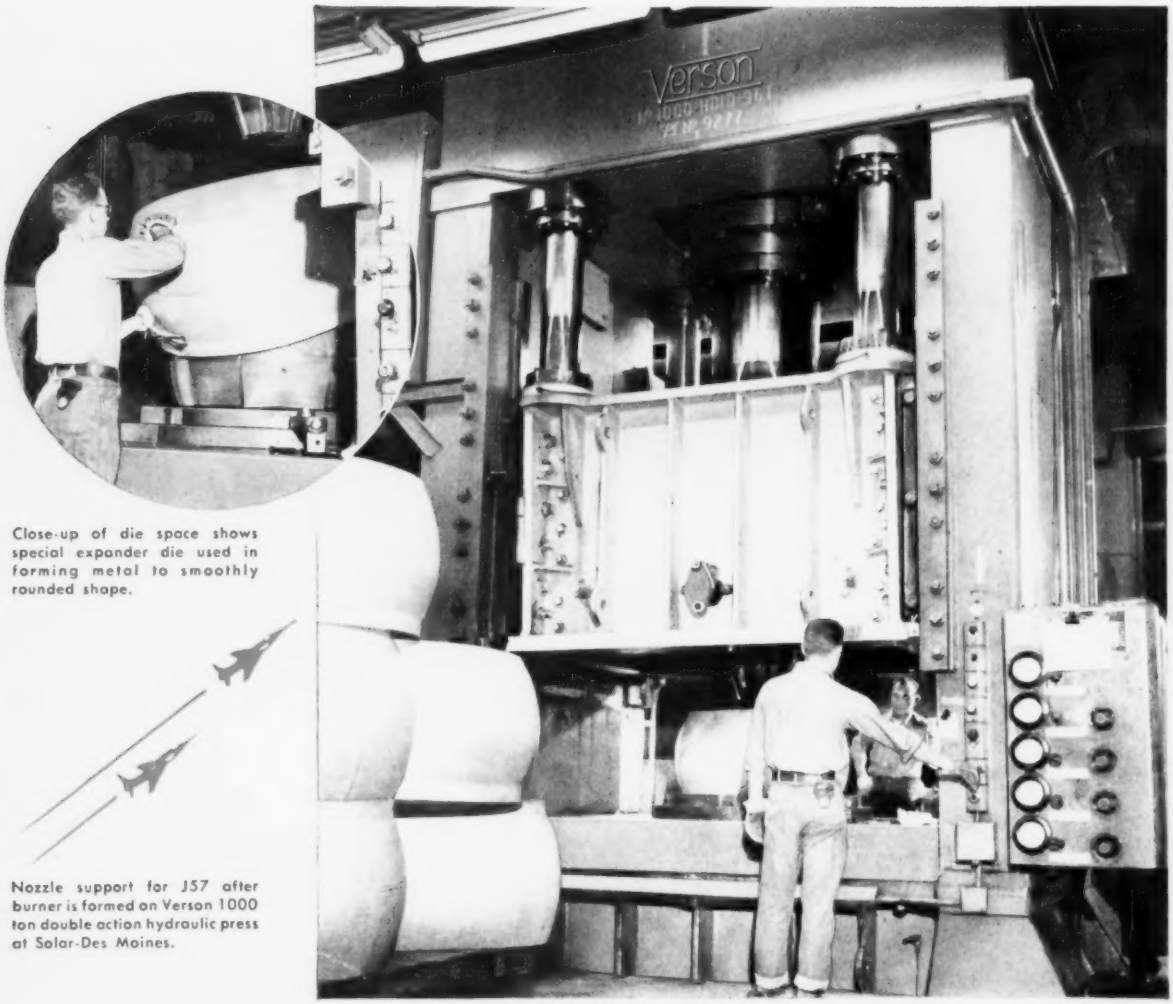
MAKE THE BEST METALS BETTER

* ORIGINATORS AND LEADING PRODUCERS OF SINGLE STACK RADIANT TUBE FURNACES



Close-up of die space shows special expander die used in forming metal to smoothly rounded shape.

Nozzle support for J57 after burner is formed on Verson 1000 ton double action hydraulic press at Solar-Des Moines.

Another Verson Press proves its versatility

. . . forming jet engine components at Solar Aircraft Company

This is Verson versatility at work . . . a 1000 ton Verson double action hydraulic press . . . "workhorse" at Solar Aircraft Company's Des Moines plant.

Solar produces components for jet and turbo-jet engines which power a number of our best known aircraft. They are also engaged in the manufacture of components for guided missiles. To this end, a variety of tasks are assigned to this Verson Press, including heavy duty expanding, sheet metal embossing and deep drawing. Forming is done primarily with 300 series or 410 stainless steels, ranging in thickness from .031 to .093.

The double action press, largest of its type at Solar-Des Moines, has proved a rugged and versatile production tool. In addition to the heavy jobs, it handles general production when needed.

Big job . . . small job . . . there's a Verson press for you. For specific recommendations send an outline of your requirements.

A Verson Press for every job from 60 tons up.

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